FLORA OF TROPICAL AFRICA.

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FLORA

OF

TROPICAL AFRICA.

EDITED BY

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VOL. IV.—SECTION 2.

HYDROPHYLLACEÆ TO PEDALINEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR THE COLONIES.

LONDON:

LOVELL REEVE & CO., LIMITED,

Publishers to the Home, Colonial and Indian Governments,

6 HENRIETTA STREET, COVENT GARDEN.

1906.

Mo. Bot. Garden
1908

DATES OF PUBLICATION OF THE SEVERAL PARTS OF THIS VOLUME.

Part I. pp. 1–192 was published *December* 1905.

„ II. „ 193–384 „ *February* 1906.

„ III. „ 385 to end „ *June* 1906.

PREFACE.

As already explained, the large and constantly increasing mass of material having exceeded the space allotted to it, made it necessary to divide Volume IV of the "Flora of Tropical Africa" into two sections, which, however, are themselves of equivalent bulk to volumes and might have been numbered as such had not the plan on which it has been found advisable to prepare the work made this impracticable.

For the amended definition of the regions into which the area of the flora is divided, reference may be made to the preface to the seventh volume.

In the prefaces to the first, the preceding section of this and succeeding volumes, will be found an enumeration of the materials employed up to 1868, and of the most important additions to them which have reached Kew since.

The further collections cited in the present volume are:

I. Upper Guinea.—Sir H. H. Johnston, G.C.M.G., K.C.B., and H. Reynolds, Liberia; E. W. Foster and N. L. Phillips, Lagos; W. R. Elliott, Northern Nigeria; Capt. G. B. Gosling, Norman C. McLeod and H. N. Thompson, Southern Nigeria.

III. Nile Land.—Lieut.-Col. A. F. Appleton, Dr. R. E. Drake-Brockman and Major D. Thomson, Somaliland; H. Brown, Bahr-el-Ghazal; Dr. A. G. Bagshawe, E. Brown and M. T. Dawe, Uganda; Sir Evan James, K.C.I.E., C.S.I., Uganda and British East Africa; C. F. Elliott, A. P. Grenfell, Claude Hollis and Andrew Linton, British East Africa.

IV. Lower Guinea.—Prof. H. H. W. Pearson, Damaraland.

V. South Central.—H. N. Ridley, plants collected by Major F. Chaves in the Congo State.

VI. Mozambique.—J. F. Cunningham and Miss E. Kenyon,

Nyasaland; E. C. F. Allen, T. Gardner, Lord Kesteven and F. W. Sykes, Rhodesia.

Once more I must record my acknowledgments of the aid given me by Assistants in the Herbarium of the Royal Botanic Gardens; to Mr. C. H. Wright, A.L.S., in preparing the manuscript for the press and in checking the proofs; and to Mr. N. E. Brown, A.L.S., for working out the geographical distribution.

For the detailed topography the third edition of the "Spezialkarte von Afrika," Gotha: Justus Perthes, 1893, has been chiefly used.

W. T. T.-D.

KEW, *March* 31, 1906.

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CONSPECTUS OF THE ORDERS CONTAINED IN THE FOURTH VOLUME.—SECTION 2.

Cohort VIII.—Polemoniales. *Corolla regular. Stamens usually as many as the corolla-lobes and alternate with them. Leaves alternate.*

LXXXVIII. HYDROPHYLLACEÆ. Corolla-lobes imbricate, rarely contorted. Ovules 2–∞. Capsule loculicidal. Endosperm copious, fleshy. Herbs or undershrubs.

LXXXIX. BORAGINEÆ. Corolla-lobes imbricate, rarely contorted. Ovules 1–2 in each cell. Fruit of two or four 1–2-seeded nutlets or pyrenes. Endosperm scanty or none. Herbs, shrubs or trees.

XC. CONVOLVULACEÆ. Corolla-lobes induplicate-valvate, or limb more or less plicate. Ovules 1–2 in each cell. Fruit usually capsular, more rarely indehiscent and fleshy or woody. Endosperm copious, cartilaginous; embryo straight. Herbs, undershrubs or shrubs, often climbing; leafless parasites in *Cuscuta*.

XCI. SOLANACEÆ. Corolla-lobes induplicate-valvate or imbricate, or limb plicate. Ovules numerous. Fruit baccate or capsular. Endosperm fleshy; embryo more or less curved.

Cohort IX.—Personales. *Corolla more or less irregular or oblique Stamens 5–2; when 5 the posticous smaller than the others or infertile. Ovary superior, of 2 carpels. Ovules sometimes 2 to each carpel, usually more, often numerous, if 2 superposed, or in a few genera collateral. Fruit usually a capsule.*

XCII. SCROPHULARIACEÆ. Herbs or small shrubs. Leaves alternate, opposite or verticillate, simple. Inflorescence various. Ovary perfectly 2-celled; ovules many on axile placentas.

XCIII. OROBANCHACEÆ. Leafless parasitic herbs. Spikes or racemes terminal, few- or many-flowered. Ovary 1-celled; placentas 4, parietal, distinct or fused in pairs.

XCIV. LENTIBULARIEÆ. Small aquatic or marsh herbs, furnished with small bladders. Leaves entire or divided into narrow segments. Racemes terminal or axillary, simple or branched. Ovary 1-celled; placenta globose or ovoid, free central.

XCV. GESNERACEÆ. Herbs or very small shrubs. Leaves opposite or subradical (alternate in *Linnæopsis*), undivided. Cymes axillary or subradical. Ovary 1-celled (at least in the upper part); placentas 2, parietal, much intruded.

XCVI. BIGNONIACEÆ. Trees or shrubs, frequently twiners or climbers. Leaves opposite, rarely whorled or alternate, usually compound. Ovary 2-celled, more rarely 1-celled with 2 parietal placentas; ovules numerous.

XCVII. PEDALINEÆ. Herbs, rarely shrubs or small trees. Leaves opposite or the upper alternate, simple. Ovary 2–4-(rarely 1-)celled; ovules solitary, or many superposed.

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1905.

FLORA OF TROPICAL AFRICA.

Order LXXXVIII. **HYDROPHYLLACEÆ.** (By J. G. Baker, with additions by N. E. Brown.)

Flowers hermaphrodite, regular. Calyx inferior, deeply divided or cut to the base; lobes usually 5, rarely 8–12, imbricate or open in æstivation. Corolla gamopetalous, various in shape; lobes usually 5, rarely 8–12, imbricate. Stamens as many as the corolla-lobes, inserted at the sinuses or low down in the corolla-tube; filaments filiform or dilated at the base; anthers 2–celled, dehiscing longitudinally. Hypogynous disk 0 or inconspicuous. Ovary superior 1-celled with 2 parietal placentas or 2-celled; ovules 2 or more to each placenta; style filiform, usually bifid; stigmas capitate. Fruit usually a loculicidally 2-valved capsule. Seeds oblong, globose or angled; testa usually tubercled, reticulate or rugose; albumen copious, fleshy; embryo small.—Annual or perennial herbs, rarely undershrubs, Stem-leaves usually alternate. Flowers in scorpioid or trichotomous cymes, or racemes or clusters.

Species about 150, mostly American.

Calyx-lobes, corolla-lobes and stamens 8–12 . .	1. Codon.
Calyx-lobes, corolla-lobes and stamens 5 . . .	2. Hydrolea.

1. **CODON**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 830.

Calyx 8–12-lobed almost to the base; lobes linear, open in æstivation. Corolla-tube campanulate, plaited; lobes 8–12, oblong. Stamens 8–12, inserted at the base of the corolla-tube and connected with it by thin or much compressed partitions at the base of the filiform filaments; anthers oblong. Ovary ovoid, 2-celled; style filiform, bifid to about halfway down; stigmas simple, small; ovules numerous. Capsule 2–valved, enveloped in the persistent calyx. Seeds numerous, angular, covered with large flattened bladdery cells.—Coarse, erect herbs; stems, leaves and calyx covered with spreading spines. Leaves alternate,

petioled, sinuate. Flowers in terminal scorpioid cymes with leafy bracts.—Choisy in Ann. Sc. Nat. sér. 2, i. 181.

The only two species, both of which extend into South Africa.

Corolla 13–14 lin. long, white, striped with purple . 1. *C. Royeni.*
Corolla 7 lin. long, yellow . . . . . 2. *C. Schenckii.*

1. **C. Royeni,** *Linn. Syst. Nat. ed.* 12, ii. 292. A stout, erect, much-branched shrub, 3 ft. or more high, armed, except the corolla, with copious spreading white spines, $\frac{1}{4}$–$\frac{1}{3}$ in. long, and densely covered with a fine subtomentose spreading glandular pubescence. Leaves ovate, 1–3 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. broad, acute or subobtuse, rounded at the base, sinuate on the margin, scabrid on both sides; petiole $\frac{1}{3}$–1 in. long. Flowers in terminal scorpioid cymes; bracts leaf-like; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. long. Calyx-lobes $\frac{2}{3}$–1 in. long, linear or spathulate. Corolla campanulate, 8–12-lobed, white, with 8–12 purple stripes and thinly pubescent outside; tube about $\frac{3}{4}$ in. long, plaited; lobes 4–5 lin. long, 2–$2\frac{1}{2}$ lin. broad, oblong, obtuse, with a few glands on the back of the apical part. Stamens shorter or longer than the corolla; filaments filiform, hairy at the base, their basal partitions 2 lin. long, $1\frac{3}{4}$ lin. broad, bordered with woolly hairs which connect in an arched line with those from the adjoining partitions. Anthers $1\frac{1}{4}$–$1\frac{2}{3}$ lin. long, oblong; style hairy at the base. Capsule 4–5 lin. in diam., globose, acuminate, often sprinkled with black glands.—Thunb. Fl. Cap. ed. Schultes, 389; Andr. Bot. Rep. t. 325; DC. Prodr. x. 589; Engl. Jahrb. x. 247; Kuntze in Jahrb. Bot. Gart. Berlin, iv. 268, C. H. Wright in Dyer, Fl. Cap. iv. ii. 2.

Lower Guinea. Hereroland: in sandy ground near Usakos, 2900 ft., *Marloth,* 1234; and without precise locality, *Pechuel-Loesche.*

Also in South Africa.

2. **C. Schenckii,** *Schinz in Abhandl. Bot. Ver. Brandenb.* xxx. 173, very near *C. Royeni,* from which it differs as follows: Calyx-lobes $\frac{1}{3}$–$\frac{1}{2}$ in. long. Corolla yellow; tube 3–$3\frac{1}{2}$ ($5\frac{1}{2}$ ex *Schinz*) lin. long; lobes $3\frac{1}{2}$ (2 ex *Schinz*) lin. long, $2\frac{1}{4}$–$2\frac{1}{2}$ ($1\frac{1}{2}$ ex *Schinz*) lin. broad. Partitions connecting the base of the stamens to the corolla $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad, obtriangular, densely bordered with white woolly hairs, which extend in double rows a short distance up the corolla-tube and inarch to meet those from the adjoining stamens. Anthers 1 lin. long. —Engl. Jahrb. x. 248; C. H. Wright in Dyer, Fl. Cap. iv. ii. 2. *C. Dregei,* E. Meyer in Drège, Zwei Pflanzengeogr. Documente, 17.

Lower Guinea. German South-west Africa: Hereroland; Tscharridib, 1800 ft., *Marloth,* 1235; and without precise locality, *Luderitz, Schinz.* South-west Africa, lat. 23°, *Chapman & Baines!*

Also in Great and Little Namaqualand.

2. **HYDROLEA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 831.

Calyx 5-partite; æstivation imbricate at the base, open above. Corolla 5-lobed almost to the base, rotate-campanulate. Stamens 5,

inserted at the sinuses of the corolla; filaments fiilform, usually dilated at the base; anthers sagittate. Ovary 2- (rarely 3-) celled; placentas fleshy, adnate to the dissepiments; ovules many in a cell; styles 2, distinct from the base, subulate; stigmas simple or capitate. Capsule globose, ellipsoid or ovoid, membranous, usually septicidally 2-valved. Seeds many, minute. Herbs or undershrubs, sometimes spinous, glabrous or softly glandular-pilose. Leaves alternate, entire. Flowers blue, usually in peduncled bracteate cymes, which form a panicle, sometimes in axillary clusters or racemes.

Species, about 20, spread widely in the Tropical and Temperate regions of both hemispheres.

All the following species are herbaceous, without spines.

Flowers racemosely arranged along the stems in axillary clusters or very short racemes	1. *H. guineensis.*
Flowers in panicled cymes	
Sepals cordate; cymes lax, few-flowered . . .	2. *H. macrosepala.*
Sepals lanceolate or ovate-lanceolate; cymes compact, many-flowered	
Pedicels and sepals with long glandular hairs .	3. *H. sansibarica.*
Pedicels and sepals glabrous to the eye	
Staminal-filaments with a cross-shaped or obcordate dilatation at the base . . .	4. *H. floribunda.*
Staminal-filaments with a deltoid-ovate or rhomboid dilatation at the base . . .	5. *H. graminifolia.*

1. **H. guineensis,** *Choisy in Ann. Sc. Nat. sér.* 2, i. 180.—Main stem apparently decumbent or creeping, with erect or ascending branches 3–18 in. high, not hollow, glabrous. Leaves $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, 2–8 lin. broad, lanceolate, acute or acuminate, acutely tapering at the base into a petiole 1–7 lin. long, glabrous. Flowers racemosely arranged in numerous axillary clusters of 3–5 or the lower 4–7-flowered; racemes $\frac{1}{3}$–1 in. long. Bracts $1\frac{1}{2}$–8 lin. long, lanceolate or linear-lanceolate, glabrous. Pedicels $\frac{1}{2}$–1 lin. long, glabrous. Sepals $2\frac{1}{2}$–3 (in fruit $3\frac{1}{2}$–4) lin. long, $\frac{1}{2}$–$1\frac{1}{3}$ lin. broad, unequal, lanceolate or ovate-lanceolate, acute, glabrous. Corolla blue, glabrous; lobes nearly 1 lin. long, $\frac{3}{4}$–1 lin. broad, oblong or narrowly elliptic-oblong, rounded at the apex. Staminal-filaments $1\frac{1}{4}$–$1\frac{1}{3}$ lin. long, filiform, with a deltoid dilated base; anthers $\frac{3}{4}$ lin. long. Hypogynous disk very inconspicuous. Styles $\frac{3}{4}$–1 lin. long. Capsule about 2 lin. long, subglobose or very broadly ovoid.—DC. Prodr. x. 180. *H. glabra,* Schum. & Thonn. Beskr. Guin. Pl. 161, not of Smith or other authors. *H. zeylanica,* A. W. Benn. in Journ. Linn. Soc. xi. 275, partly, not of Vahl.

Upper Guinea. Senegal, *Heudelot* or *Leprieur,* 79! Sierra Leone: between Kahreni and Lokko, *Scott-Elliot,* 5805! Guinea, *Thonning.* Lagos: Abeokuta, *Irving,* 46! Southern Nigeria: Abo, *Barter,* 185! Cameroons: Yaunde, *Zenker,* 1486!

Lower Guinea. Congo, *Smith!*

Allied to *H. zeylanica,* Vahl, but easily recognised by its more clustered flowers and much shorter pedicels.

The name *H. glabra* cannot be maintained for this plant, and has been so misunderstood by A. W. Bennett in his "Review of the Genus Hydrolea," in

Journ. Linn. Soc. xi., 266–279, that the following synonymy of the true plant may be worth giving : *H. glabra*, Banks ex Smith in Rees, Encycl., xxi. (1819), under *Lycium ;* Choisy in Ann. Sc. Nat., sér. 1, xxx., 240 (1833), sér. 2, i., 180 (1834), and in DC. Prodr. x. 181. *Lycium capsulare*, Linn. Amœn. Acad. iv. 308.

Mexico, *Miller*.

Smith states that the specimen in the Banksian (British Museum) Herbarium, which Choisy described, is the other half of Miller's specimen in the Linnean Herbarium.—*N. E. Br.*

2. **H. macrosepala,** *A. W. Bennett in Journ. Linn. Soc.* xi. 277, *t.* 1, *fig.* 13. Stems annual (*Barter*), erect, 8–24 in. high, glabrous, branched in the upper half. Leaves glabrous, lanceolate or the upper linear, acute, obtusely rounded or subtruncate at the base, sessile or very shortly petioled, 1–2 in. long, $1\frac{1}{4}$–5 lin. broad. Panicle 3–12 in. long, 3–9 in. broad, very lax, glabrous in all parts; branches sometimes trichotomous, but more usually alternately branched, laxly few-flowered, bracteate with reduced leaves ; pedicels 1–6 lin. long, slender. Sepals $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long when in flower, increasing to $3\frac{1}{2}$–4 lin. long in fruit, unequal, cordate-ovate, acute, the larger $1\frac{2}{3}$, increasing to $2\frac{1}{2}$ lin. broad, thin, green. Corolla shorter than the calyx, blue; lobes $1\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, elliptic-oblong, rounded at the apex. Staminal-filaments $\frac{3}{4}$ lin. long, filiform, slightly dilated at the base ; anthers $\frac{1}{2}$ lin. long. Styles $\frac{1}{2}$ lin. long. Capsule subglobose, $1\frac{1}{2}$–2 lin. long, enclosed in the calyx.

Upper Guinea. Northern Nigeria : Nupe, in swamps, *Barter*, 902 !

Nile Land. Jur : Jur Ghattas, *Schweinfurth*, 2540 !

The sepals in Schweinfurth's specimen are roundish-cordate, broader in proportion to their length (which does not exceed 3 lin. in fruit), and are less tapering to the apex than in the type from which the above description is made, but I find no other difference.—*N. E. Br.*

3. **H. sansibarica,** *Gilg in Engl. Pfl. Ost-Afr. C.* 335. Stems 1–2 ft. high, erect, 1–2 lin. thick, hollow, simple and glabrous below, paniculately branched and glandular-hairy above. Leaves $1\frac{3}{4}$–$3\frac{1}{2}$ in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, lanceolate, acute, somewhat acutely narrowed at the base into a petiole $\frac{1}{2}$–$1\frac{1}{2}$ lin. long, spreading or ascending, glabrous on both sides. Panicle 2–6 in. long, $1\frac{1}{2}$–5 in. broad, glandular-hairy on the branches, bracts, pedicels and calyx ; branches 1–2 in. long, ending in many-flowered trichotomous rather compact cymes; pedicels 1–4 lin. long. Sepals $1\frac{1}{2}$–2 lin. long, about $\frac{1}{2}$ lin. broad, lanceolate, acuminate. Corolla scarcely exceeding the calyx, blue, glabrous ; lobes $1\frac{1}{2}$ lin. long, 1 lin. broad, elliptic-ovate, rounded at the apex. Staminal-filaments $\frac{3}{4}$–1 lin. long, filiform, with a broadly deltoid-ovate dilated base ; anthers $\frac{1}{2}$ lin. long. Hypogynous disk not broader than the ovary, $\frac{1}{3}$ lin. in diam. Styles $\frac{1}{3}$–$\frac{1}{2}$ lin. long. Capsule $1\frac{1}{2}$–2 lin. long, globose-ovoid.

Mozamb. Dist. Zanzibar : Kokotoni, *Stuhlmann*, i., 747 (ex *Gilg*), in swamps, *Kirk ! Hildebrandt*, 994 ! also coast region of the mainland, *Holst* (ex *Gilg*).

4. **H. floribunda,** *Kotschy & Peyr. Pl. Tinn.* 22, *t.* 9, *fig. B.* Stems glabrous, erect, branched in the upper part. Leaves linear, narrowed at the base, glabrous, $\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{3}$–$2\frac{1}{2}$ lin. broad. Panicle oblong or subcorymbose, 6–8 in. long, $2\frac{1}{2}$–4 in. broad, with ascending branches $\frac{1}{2}$–4 in. long, ending in dense many-flowered cymes, which are usually rather crowded, glabrous in all parts. Pedicels 1–4 lin. long. Sepals $1\frac{1}{2}$–2 lin. long, ovate-lanceolate, acute. Corolla blue; lobes 3 lin. long, about $1\frac{1}{2}$ lin. broad, elliptic-ovate, subobtuse. Staminal-filaments $1\frac{1}{2}$–2 lin. long, filiform, with a cross-shaped dilatation at the base, the arms of which have a dorsal upcurved auricle; anthers about $1\frac{1}{3}$ lin. long. Hypogynous disk conspicuous, $\frac{2}{3}$ lin. in diam., 5-crenate. Styles 2 lin. long. Capsule ellipsoid, $1\frac{2}{3}$ lin. long.

Nile Land. Bongo: banks of the River Jur, *Tinne.* Dar Fertit: by the Nguggu River, a tributary of the River Kura, *Schweinfurth*, iii., 131!

5. **H. graminifolia,** *A. W. Benn. in Journ. Linn. Soc.* xi. 277, *t.* 1, *fig.* 12, Perennial (*Barter*). Stems creeping and rooting at the base, then erect, 2–4 ft. high, 2–$3\frac{1}{2}$ lin. thick, straight, simple, branched only at the inflorescence, hollow, glabrous. Leaves 2–$3\frac{1}{2}$ in. long, 1–$2\frac{1}{2}$ in. broad, linear, acute, narrowed at the base, glabrous, erect, those at the base of the flowering branches gradually smaller and reflexed. Panicle 3–8 in. long, oblong or corymbose, rather compact; branches ascending $\frac{1}{2}$–4 in. long, naked below, ending in dense many-flowered cymes, glabrous or most minutely puberulous on the pedicels and calyx. Pedicels 1–4 lin. long. Sepals $1\frac{1}{2}$–2 lin. long, lanceolate or narrowly ovate-lanceolate, acute. Corolla intense blue; lobes 3–4 lin. long, $1\frac{1}{2}$–2 lin. broad, elliptic or elliptic-ovate, rounded at the apex. Staminal-filaments 2 lin. long, filiform, with a deltoid-ovate or broadly rhomboid dilated base; anthers $1\frac{1}{3}$–$1\frac{1}{2}$ lin. long. Hypogynous disk rather inconspicuous, scarcely $\frac{1}{2}$ lin. in diam. Styles 3 lin. long. Capsule globose or ellipsoid, $1\frac{1}{2}$–2 lin. long.

Upper Guinea. French Guinea: Sulimania; Erimakuna, in wet mud, *Scott-Elliot*, 5235! Northern Nigeria: Nupe; swamp near Jeba, *Barter*, 888!

ORDER LXXXIX. **BORAGINEÆ.** (By J. G. Baker, with additions by C. H. Wright.)

Flowers hermaphrodite, usually regular. Calyx inferior; tube campanulate, often very short; lobes usually 5. Corolla gamopetalous; tube campanulate, funnel-shaped or cylindrical; often furnished at the throat with gibbosities or small scales; lobes usually 5, imbricate. Stamens as many as the corolla-lobes, inserted in or at the throat of the corolla-tube; filaments filiform; anthers dehiscing longitudinally, various in shape. Disk annular or obsolete. Ovary superior of two cells with two ovules in each or four lobes with one ovule in each; style inserted at the apex of the ovary, or between the lobes, simple or once or twice forked; ovules erect or nearly horizontal. Fruit indehiscent or breaking up into four nutlets. Seeds erect, oblique or

subhorizontal; hilum small; testa membranous; albumen present or absent; embryo straight or curved; cotyledons usually entire, rarely bifid or plicate.—Herbs, shrubs or trees. Leaves alternate, exstipulate. Inflorescence normally a dichotomous cyme; branches frequently scorpioid. Flowers various in colour, usually blue or white. Calyx often more or less accrescent.

Species 1200, cosmopolitan in temperate and tropical regions.

* Style terminal on the ovary.
  Stigma terminal on the style.
    Style twice forked . . . . . 1. CORDIA.
    Style once forked.
      Stamens inserted at or near the throat of the corolla-tube . . . . . 2. EHRETIA.
      Stamens inserted low down in the corolla-tube 3. RHABDIA.
    Styles two, distinct . . . . . 4. COLDENIA.
    Style simple . . . . . 5. POSKEA.
  Style with a stigmatose ring below the apex.
    Fruit usually drupaceous . . . . 6. TOURNEFORTIA.
    Fruit of 4 dry nutlets . . . . . 7. HELIOTROPIUM.
** Style inserted between the four lobes of the ovary.
  Calyx large, very accrescent . . . . . 8. TRICHODESMA.
  Calyx but little accrescent.
    † Flowers regular.
      Nutlets depressed orbicular . . . 9. CYNOGLOSSUM.
      Nutlets ovoid, triquetrous on the inner face.
        Throat of the corolla appendiculate with scales . . . . . 10 ANCHUSA.
        Throat of the corolla without scales
          Style bifid. . . . . 11. ARNEBIA.
          Style simple.
            Filaments as long as the anthers . 12. SERICOSTOMA.
            Filaments very short.
              Corolla-lobes contorted . . . 13. MYOSOTIS.
              Corolla-lobes imbricate . . 14. LITHOSPERMUM.
    †† Flowers more or less irregular.
      Corolla-limb nearly regular . . . 15. LOBOSTEMON.
      Corolla-limb distinctly irregular.
        Stamens short . . . . . 16. ECHINOCHILON.
        Stamens long . . . . . 17. ECHIUM.

1. CORDIA, Linn.; Benth. et Hook. f. Gen. Pl. ii. 838.

Flowers often polygamous. Calyx-tube funnel-shaped or tubular, smooth or sulcate; lobes 2–5, short, sometimes cohering. Corolla-tube cylindrical or funnel-shaped; lobes 4–5, patent or recurved, usually imbricate or subcontorted. Stamens usually 4–5, inserted in the corolla-tube; filaments filiform; anthers ovate-oblong or linear. Ovary 4-celled; style elongated, filiform, twice forked; stigmas 4, linear or capitate; ovule erect, attached at the base or below the middle. Fruit a drupe surrounded by the persistent accrescent calyx; endocarp usually bony; cells 4 or by abortion fewer, 1-seeded. Seeds ascending, exalbuminous; cotyledons very plicate; radicle short.—Trees or shrubs. Leaves alternate, rarely subopposite, petioled, entire or crenate-dentate.

Flowers arranged in all the African species in panicled cymes with scorpioid branches. Corolla white or yellow, varying greatly in size.

Species about 200, tropical or subtropical, concentrated in America.

C. Sebestena, Linn. (*C. speciosa*, Willd), with large bright red flowers, is planted at Sierra Leone, *Scott-Elliot*, 5910 ! It is a native of the West Indies.

Corolla 9 lin. or more in diam.
Calyx strongly sulcate.
Corolla-lobes very short and broad.
Leaves rounded at the base.
Hairs on lower surface of the leaves not matted — 1. *C. abyssinica.*
Hairs on lower surface of the leaves densely matted — 2. *C. Holstii.*
Leaves acute at the base.
Leaves drab pubescent beneath — 1. *C. abyssinica*, var.
Leaves reddish pilose beneath — 3. *C. harara.*
Corolla-lobes much longer than broad.
Filaments glabrous; corolla-lobes obtuse — 4. *C. stenoloba.*
Filaments hairy; corolla-lobes mucronate.
Leaves scabrid above — 5. *C. Dewevrei.*
Leaves not scabrid above.
Branchlets velvety pubescent — 6. *C. aurantiaca.*
Branchlets glabrous — 7. *C. Dusenii.*
Calyx slightly sulcate — 8. *C. Fischeri.*
Calyx not sulcate.
Leaves glabrous; calyx ampulliform in fruit — 9. *C. subcordata.*
Leaves pubescent beneath; calyx campanulate in fruit — 10. *C. chrysocarpa.*

Corolla less than 9 lin. in diam.
* Leaves alternate.
† Panicles divaricately branched; branches stout, pubescent.
Corolla-tube cylindrical.
Corolla-lobes ovate-oblong, 4 lin. long — 11. *C. Milleni.*
Corolla-lobes oblong, 2 lin. long — 12. *C. longipes.*
Corolla-tube funnel-shaped.
Leaves not scabrid above; calyx woolly pubescent outside.
Inflorescence terminal.
Leaves acuminate — 13. *C. platythyrsa.*
Leaves obtuse — 14. *C. Irvingii.*
Inflorescence axillary — 15. *C. liebrechtsiana.*
Leaves scabrid above; calyx with straight adpressed hairs outside.
Leaves orbicular — 16. *C. Johnsoni.*
Leaves obovate — 17. *C. Warneckei.*

†† Panicles lax, but not divaricately branched; branches slender, glabrous or nearly so.
Leaves obtuse.
Corolla 4-lobed — 18. *C. Gœtzei.*
Corolla 5-lobed — 19. *C. Myxa.*
Leaves acuminate, oblong.
Style-arms very short — 20. *C. Heudelotii.*
Style-arms long, linear — 31. *C. Zedambæ.*
Leaves acuminate, ovate or elliptic — 22. *C. senegalensis.*
Leaves acuminate, ovate-lanceolate — 23. *C. Mannii.*

††† Panicles not lax in flower.
Calyx pubescent outside.
Filaments glabrous . . . . 24. *C. ovalis.*
Filaments hairy.
Calyx cup-shaped . . . . 25. *C. Stuhlmannii.*
Calyx funnel-shaped . . . 26. *C. dioica.*
Calyx tubular-campanulate . . 27. *C. crenata.*
Calyx tubular, constricted at the mouth . . . . . 28. *C. guineensis.*
Calyx tomentose outside . . . 29. *C. quarensis.*
Calyx pilose outside.
Leaves ovate or suborbicular . . 30. *C. pilosissima.*
Leaves oblanceolate-oblong . . 31. *C. somaliensis.*
** Leaves opposite or subopposite . . . . 32. *C. Rothii.*

1. **C. abyssinica,** *R. Br. in Salt, Abyss. Append.* 64.—A medium-sized tree; young branchlets clothed with drab tomentum. Leaves ovate or suborbicular, up to 7 by 5 in., more or less rounded at the base, subcoriaceous, scurfy above when young, not very rough, pubescent beneath; lateral nerves about 7 pairs; petiole up to 2 in. long. Cymes scorpioid, collected into an ample terminal panicle; branches and calyx drab-tomentose. Calyx deeply 10-sulcate, tubular-campanulate, 3 lin. long; teeth broadly deltoid, cohering in bud. Corolla funnel-shaped, 9 lin. in diam., 3 times as long as the calyx; lobes short, rounded, undulate at the margins. Stamens much shorter than the corolla; filaments hirsute at the base. Style slightly longer than the stamens. Fruit ovoid, 6 lin. in diam., smooth.—A. Rich. Tent. Fl. Abyss. ii. 80; Schweinf. Beitr. Fl. Aethiop. 117; Engl. Hochgebirgsfl. Trop Afr. 351. *Varronia abyssinica,* DC. Prodr. ix. 469. *Calyptraria africana,* Lam. ex DC. l.c.

Nile Land. Eritrea: near Acrur, 6200 ft, *Schweinfurth & Riva,* 1125! Abyssinia: near Adowa, *Schimper,* 285! 1935! north Tigre, *Steudner,* 858! Amba Sea, *Schimper!* Makhfoot, *Roth,* 428! and without precise locality, *Quartin Dillon & Petit,* 195! *Schimper,* 848! Galabat: by the River Gendua, *Schweinfurth,* 1499! Sennar: Fazokl, *Kotschy,* 466! Kordofan: Bara village, *Kotschy,* 306! Blue Nile near Abu Shendy, *Muriel,* L, 30! Uganda: Ruwenzori; Wimi Valley, 6000–7000 ft., *Scott-Elliot,* 7841!

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Buchanan,* 89! Namasi, *Cameron,* 7! and without precise locality, *Buchanan,* 357! 1146!

Var. β *acutifolia,* A. Rich. Tent. Fl. Abyss. ii. 80. Leaves elliptic, acute at the base or at both ends.—Hiern in Cat. Afr. Pl. Welw. i. 714.

Lower Guinea. Angola: Golungo Alto; on the banks of the River Quiapoze, *Welwitsch,* 5433!

Also in Arabia.

2. **C. Holstii,** *Gürke in Engl. Pfl. Ost-Afr. C.* 335, *t.* 41.—A tree 20 ft. high, with the habit of *Tilia,* but with a rounder crown; young branchlets pubescent. Leaves suborbicular or broadly ovate, broadly rounded or subcordate at the base, entire, subcoriaceous, 3–5 in. long, yellow scurfy on the upper surface when young, soon glabrous, densely yellow tomentose beneath; petiole 1–1½ in. long. Cymes 3–5-flowered, in lax terminal panicles; branchlets and calyx densely tomentose.

Calyx campanulate-turbinate, shallowly 10-sulcate, 3 lin. long; teeth 4–5, short, broadly deltoid. Corolla white, 9 lin. long, shallowly and roundly lobed. Stamens much shorter than the corolla; anther-cells divaricate at the base; filaments hirsute at the base. Style exserted; arms flat.—Engl. Jahrb. xxviii. 306.

Nile Land. Uganda: Lendu Plateau, west of the Albert Nyanza, *Stuhlmann*, 2735. British East Africa: Galunka, *Kässner*, 778!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 4900 ft., *Volkens*, 249! Usambara: Kisara, in forest, *Holst*, 2347! Kwa Mshuza, *Holst*, 9068!

This much resembles some of the Nyasaland specimens of *C. abyssinica*, R. Br.

3. **C. harara,** *Beck in Paulitschke, Harar*, 457. A tree; branchlets tomentose. Leaves ovate, 4–5 in. long, half as broad, very shortly and unequally narrowed to the base, acuminate, obscurely and distantly serrate; entire near the apex, glabrous above, pilose with reddish hairs beneath; lateral nerves 5–6 pairs; petiole 2 in. long, minutely tomentose, pilose towards the apex. Cymes lax, repeatedly dichotomous. Calyx-tube campanulate, tomentose, 10-sulcate, 4 lin. long, acuminate in bud, unequally and shortly toothed. Corolla broadly funnel-shaped, 1 in. long, probably white; limb obscurely lobed; lobes very broad, glabrous.

Nile Land. Somaliland: Mount Haqim, near Harar, *Hardegger & Paulitschke.*

4. **C. stenoloba,** *Gürke in Notizbl. Königl. Bot. Gart. Berlin*, i. 60. A shrub; branchlets clothed with fulvous tomentum. Leaves shortly petioled, oblong or obovate-oblong, the lower 7–8 in. long by half as broad, rounded at the base, long acuminate at the apex, irregularly dentate upwards, coriaceous, glabrous above, hairy on the nerves beneath. Panicle lax; pedicels short. Calyx 6–8 lin. long; tube cylindrical, pilose, 10-sulcate; teeth 3–5, lanceolate-deltoid, acuminate, rigid, $1\frac{1}{2}$–2 lin. long. Corolla 1 in. long, nearly twice as long as the calyx; tube narrow; lobes lanceolate, obtuse. Stamens shorter than the corolla, glabrous. Fruit ovoid, conical, glabrous, 1 in. long, 5 lin. in diam.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 502, 505, 510, 594!

5. **C. Dewevrei,** *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxviii. 37. A shrub $6\frac{1}{2}$–8 ft. high; branchlets pilose. Leaves alternate or subopposite, elliptic, acute or abruptly acuminate, acute or almost cordate at the base, $2\frac{1}{2}$–6 in. long, 2–$2\frac{3}{4}$ in. wide, entire or irregularly dentate; upper surface shining, scabrid, sparingly pilose, very hairy on the nerves; lower surface pilose; primary nerves impressed above, prominent beneath; petiole $2\frac{1}{2}$–5 lin. long. Cymes terminal, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, little branched, many-flowered. Calyx tubular-campanulate, longitudinally ribbed, pilose, 4 lin. long, 2 lin. in diam.; teeth 5, broad. Corolla tubular-campanulate; tube yellow; lobes 5, undulate, orange. Stamens 5, longer than the calyx; filaments yellow

anthers brown, about 1 lin. long. Style green; stigmas 4, exserted. Fruit ovoid, 7 lin. long, 4 lin. in diam., much longer than the persistent calyx.—Reliq. Dewevr. 162.

South Central. Congo Free State: Old Kasongo, *Dewèvre.*

6. **C. aurantiaca,** *Baker in Kew Bulletin*, 1894, 26. A tree 15–25 ft. high; branchlets brown velvety pubescent when young. Leaves oblong, acuminate, rounded at the base, 6 in. long, 2 in. broad, pilose on the chief nerves on both surfaces, more rarely glabrous; petiole 6 lin. long, pilose especially on the upper side. Cymes terminal, rather dense; branches and calyx densely brown velvety pubescent; flowers subsessile, 5–7-merous. Calyx 6 lin. long, tubular; teeth short, broad. Corolla-tube 6 lin. long, cylindrical; lobes obovate, long mucronate, much undulate, half as long as the tube. Stamens inserted about halfway up the corolla-tube; filaments hairy at or just above the base. Style 4 lin. long; stigmas peltate.—Hiern in Cat. Afr. Pl. Welw. i. 715; Gürke in Notizbl. Königl. Bot. Gart. Berlin, i. 58, in obs.

Upper Guinea. Fernando Po, *Barter! Mann*, 4! Cameroons: Bipinde, *Zenker*, 931! 1355! 2115! Yaunde, *Zenker*, 757! 1431! *Zenker & Staudt*, 406!

Lower Guinea. Loando: Chinchocho, *Soyaux*, 53: Gaboon: Munda: Sibange Farm, *Soyaux*, 132! Lower Congo: *Smith!* Angola: Golungo Alto; in forests and on the banks of streams near Sange, Bango, Menha-Lula, Luinha River, &c., *Welwitsch*, 5430! 5466!

In the original description the corolla-lobes are erroneously stated to be orbicular.

7. **C. Dusenii,** *Gürke in Nötizbl. Königl. Bot. Gart. Berlin*, i. 58. A tree; branchlets glabrous. Leaves ovate or oblong, 6–7 in. long by half as broad, entire, obtuse at the base, long acuminate or mucronate at the apex, membranous, glabrous on both surfaces; petiole 5–9 lin. long. Panicles from the axils of the upper leaves, few-flowered, lax; pedicels long. Calyx campanulate, 6 lin. long, fusco-tomentose, 10-sulcate; teeth 5, deltoid, 2 lin. long, long acuminate. Corolla 9–10 lin. long; lobes spathulate, very long mucronate. Stamens 9 lin. long; filaments pilose at the base. Fruit ovoid-conical, glabrous.

Upper Guinea. Cameroons: between Victoria and Bimbia, *Preuss*, 1256; and without precise locality, *Dusén*, 359*a*.

8. **C. Fischeri,** *Gürke in Engl. Pfl. Ost-Afr. C.* 335. A tree or shrub; branchlets pubescent. Leaves broadly oblong, 3–4 in. long, 2¼ in. broad, obtuse, entire, coriaceous, scabrid above, densely pubescent beneath; petiole 4–15 lin. long Cymes terminal, few-flowered, sessile or shortly peduncled. Calyx between turbinate and cylindrical, 4 lin. long, subtomentose, with 10 obscure ribs; teeth 4–5, deltoid. Corolla half as long again as the calyx. Stamens slightly exserted. Ovary glabrous. —Gürke in Engl. Jahrb. xxviii. 307.

Mozamb. Dist. German East Africa: Masai Highlands, *Fischer*, 437.

9. **C. subcordata,** *Lam. Ill.* i. 421. A middle-sized tree; young branchlets glabrous or slightly pubescent. Leaves crowded at the tip

of the branchlets, alternate, ovate or suborbicular, rounded or cuneate at the base, glabrous, penninerved, not scabrid above, 4–6 in. long; petiole 2 in. long, slender. Cymes short, axillary, few-flowered. Calyx funnel-shaped, 6 lin. long; tube glabrous or sparingly hairy, not sulcate; lobes 3–5, short, broad. Corolla white; tube funnel-shaped, about 1 lin. in diam. at the centre, much longer than the calyx; limb $1\frac{1}{2}$ in. in diam.; lobes 5–7, orbicular. Stamens as many as the corolla-lobes; filaments glabrous. Stigmas flattened. Fruit red, the size of an acorn, enclosed in the ampulliform accrescent calyx.—DC. Prodr. ix. 477; Baker, Fl. Maurit. 200; Vatke in Linnæa, xliii. 314; Preuss in Notizbl. Königl. Bot. Gart. Berlin, iii. 211.

Nile Land. British East Africa: Mombasa Island, *Hildebrandt*, 1984!

Mozamb. Dist. Portuguese East Africa: Mozambique, *Forbes!*

Also in the Mascarene Islands, Seychelles, and through Tropical Asia to Polynesia.

10. **C. chrysocarpa,** *Baker in Kew Bulletin*, 1894, 27. A tree 20–30 ft. high, with the habit of *Broussonetia*, the leaves crowded at the end of the very thick branchlets. Leaves alternate, ovate or broadly elliptic, rounded or cordate at the base, 6–8 in. long, coriaceous, very scabrid above when mature, penninerved, finely pubescent beneath with raised veinlets; petiole 2–4 in. long, clothed with fine soft brown spreading hairs. Cymes short, few-flowered. Corolla not seen. Fruit-calyx grey-green, rigid, campanulate, not sulcate, $\frac{3}{4}$ in. long, 1 in. in diam. Drupe oblong, acute, indurated, bright yellow, $1\frac{1}{2}$ in. long.—Hiern in Cat. Afr. Pl. Welw. i. 713.

Lower Guinea. Angola: Golungo Alto; outskirts of the forest in the ascent to Capopa, *Welwitsch*, 5461!

11. **C. Milleni,** *Baker in Kew Bulletin*, 1894, 27. A large tree, with stout woody branchlets. Leaves cordate-suborbicular, 6–8 in. long and broad, finely pubescent all over beneath; petiole reaching 3–4 in. long. Cymes forming an ample panicle, with long spreading branches. Calyx $\frac{1}{4}$ in. long, densely coated with drab tomentum, faintly ribbed but not sulcate; tube oblong; lobes small, ovate, acuminate. Corolla-tube cylindrical, slightly longer than the calyx; limb $\frac{1}{2}$ in. in diam.; lobes ovate-oblong, 4 lin. long, $1\frac{1}{2}$ lin. broad. Stamens inserted in the corolla-throat; filaments $1\frac{1}{2}$ lin. long, with a few long hairs near the base. Ovary conical, gradually tapering into the style, occasionally 6-celled; style-arms long, slender, fimbriate at the margins.

Upper Guinea. Lagos: Inland forests, *Millen*, 12!

According to Millen, "the wood is said not to be attacked by ants."

12. **C. longipes**, *Baker in Kew Bulletin*, 1894, 27. A tree 20–30 ft. high; branchlets angular, pilose. Leaves suborbicular, 8–10 in. long, rounded or almost cordate at the base, thin, scabrid above, pilose beneath; lateral nerves about 5 on each side, prominent beneath; petiole 2–4 in. long, pilose. Cymes terminal; branches many, pilose. Calyx oblong, 4 lin. long, densely coated with drab tomentum; teeth 2–5,

very unequal, broadly ovate, acute. Corolla sulphur-coloured, 4 lin. in diam.; tube cylindrical, 5 lin. long; lobes 5, oblong, obtuse, 2 lin. long, 1½ lin. broad. Stamens inserted in the corolla-throat; filaments 1¼ lin. long, slender, glabrous. Ovary conical, tapering into the style; style bipartite nearly to the base; ultimate branches linear, 4 lin. long, stigmatose along the upper part. Fruit ovoid-conic, mucronate, 1 in. long, seated on the ash-coloured hardened cup-shaped calyx.—Hiern in Cat. Afr. Pl. Welw. i. 714.

Lower Guinea. Angola: Golungo Alto; in forests among the mountains of Sobato de Bumba, *Welwitsch*, 5428! at Undelle, *Welwitsch*, 5432!

13. **C. platythyrsa,** *Baker in Kew Bulletin*, 1894, 27. A tree 30–80 ft. high; branchlets pubescent. Leaves ovate to suborbicular, up to 5 in. long and 4¼ in. broad, shortly acuminate, obtuse at the base, irregularly crenate or almost entire, subcoriaceous, glabrous above, pubescent beneath; lateral nerves about 5 on each side; petiole 1½–2 in. long. Cymes in a terminal ample divaricately branched panicle; branches and short pedicels densely pubescent; flowers polygamous. Calyx 2 lin. long, funnel-shaped, densely pubescent outside, not sulcate; lobes 3–5, oblong, obtuse. Corolla funnel-shaped; lobes 4–5, oblong, obtuse. Stamens 3–5, inserted in the corolla-throat; filaments hairy below their insertion. Fruit oblong, acute, glabrous. 6 lin. long, seated on the enlarged campanulate calyx. — *C. populifolia*, Baker, l.c. *C. Irvingii*, Baker, l.c. 1895, 113, partly. *C. odorata*, Gürke in Notizbl. Königl. Bot. Gart. Berlin, i. 59.

Upper Guinea. Sierra Leone: Bagru River, *Mann*, 875! Lagos: Abeokuta, *Irving!* Cameroons: Bipinde, *Zenker*, 1710! 1856! 2200! Yaunde, *Zenker*, 247! *Zenker & Staudt*, 340!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 390! 451.

14. **C. Irvingii,** *Baker in Kew Bulletin*, 1895, 113, *partly.*—A fine spreading shade tree, 60 ft. high (*Johnson*). Branches tomentose when young. Leaves obovate or almost orbicular, up to 9 in. long by 6½ in. broad, cuneate or slightly cordate at the base, upper surface minutely pitted, not scabrid, lower surface densely tomentose; petiole 5 in. long. Cymes in a much-branched terminal panicle; rhachis covered with ash-coloured pubescence; flowers polygamous. Male flower: Calyx tubular, 3-lobed, not sulcate, woolly pubescent outside, 5 lin. long; lobes ovate, acuminate, with a strong intramarginal nerve. Corolla funnel-shaped, yellowish (*Johnson*); tube 3½ lin. long; lobes 6, oblong, obtuse, 2 lin. long, 1¼ lin. broad. Stamens inserted in the corolla-throat and as long as the lobes; filaments hairy on the part adnate to the tube. Rudiment of ovary ovoid, ½ lin. long, with an apical tuft of straight hairs. Female flowers not seen. Fruit oblong, obtuse, 1½ in. long, 10 lin. in diam., seated on the enlarged hardened cup-shaped calyx.

Upper Guinea. Lagos: interior, *Rowland!* Gold Coast: East Akim, *Johnson*, 741! Asakrakra-Kwahu, *Johnson*, 625!

Var. *pilosa*, C. H. Wright. Ultimate branches of the inflorescence clothed with spreading brown hairs.

Upper Guinea. Lagos, *Millen*, 210!

15. **C. liebrechtsiana,** *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxviii. 38. A tree; branchlets pilose. Leaves alternate, ovate-rotundate, obtuse or shortly acute, rounded or more or less acute at the base or subcordate, 1½–8 in. long, 1½–6 in. long, entire, undulate, glabrous above, pilose beneath; nerves prominent beneath; petiole ¾–6 in. long. Cymes axillary, very long, irregularly much branched, many-flowered, 9–18 in. long; flowers subsessile. Calyx obscurely longitudinally ribbed, velvety outside, glabrous inside, 4 lin. long, 2 lin. in diam.; teeth 2–5, more or less acute. Corolla tubular-campanulate, 4½ lin. long, pale yellow; lobes 5, undulate. Stamens 5, included; anthers dark brown. Ovary globose; style short. Fruit unknown.—Reliq. Dewevr. 163.

South Central. Congo Free State: without precise locality, *Dewèvre.*

Judging from the description, this must be extremely close to *C. Irvingii,* Baker.

16. **C. Johnsoni,** *Baker.* A small shrub; branchlets densely hairy. Leaves very shortly petioled, orbicular, 1½–2 in. long and broad, obtuse, entire, broadly rounded at the base, subcoriaceous, slightly hairy on the upper surface, densely hairy all over beneath; lateral nerves 3–4 on each side. Cymes dense, compound, many-flowered, long-peduncled; flowers polygamous; branches very pilose; pedicels very short. Calyx turbinate, 4 lin. long, densely and adpressedly pubescent on both surfaces, not ribbed; lobes small, ovate, scarious, with strong intramarginal nerves. Corolla pale-yellow; tube funnel-shaped, 3½ lin. long; lobes 4–5, oblong, obtuse, 2 lin. long. Stamens inserted just above the middle of the corolla-tube; filaments densely pilose just above their insertion.

Upper Guinea. Gold Coast: Afram Plains, *Johnson,* 705!

Very closely allied to *C. Irvingii,* Baker, of which it may be a young or stunted state.

17. **C. Warneckei,** *Gürke MSS.* A shrub; branches pubescent. Leaves obovate, 1½ in. long, obtuse, entire, subcuneate at the base, subcoriaceous, scabrid on the upper surface, pubescent all over beneath; petiole 4 lin. long. Flowers in dense terminal cymes, with pubescent branches; pedicels very short. Calyx turbinate, pubescent on both surfaces, not ribbed, 4 lin. long; lobes small, ovate, acuminate, with a strong intramarginal nerve. Corolla-tube narrowly funnel-shaped or almost cylindrical, 5 lin. long; lobes 5, oblong, 1½ lin. long, obtuse. Stamens inserted a short distance down the corolla-tube, rather shorter than the corolla-lobes, densely pilose in the lower part Ovary rudimentary, globose.

Upper Guinea. Togo, *Warnecke,* 100! near Lome, *Warnecke,* 308!

This may prove to be only a variety of *C. Johnsoni,* Baker.

18. **C. Gœtzei,** *Engl. Jahrb.* xxviii. 307, 461. An erect shrub, 13–16 ft. high. Leaves distinctly petioled, elliptic, 3–4 in. long, scarcely twice as long as broad, obtuse, entire, membranous, glabrous on both surfaces. Cymes lax. Calyx tubular, glabrous or nearly so outside with adpressed silky pubescence inside, 2 lin. long, irregularly 3–4-toothed. Corolla white; tube 2 lin. long; lobes 4, elliptical, obtuse, 2 lin. long. Filaments 1 lin. long, hairy in the lower part; anthers broadly ellipsoid. Ovary $\frac{1}{8}$–$\frac{1}{10}$ in. long, conical; style-arms linear, $1\frac{1}{2}$ lin. long.

Mozamb. Dist. German East Africa: Khutu; between Kisaki and the River Ruaha, 1200–1300 ft., *Goetze*, 365!

19. **C. Myxa,** *Linn. Sp. Pl. ed.* 1, 190. A shrub or tree up to 40 ft. high; stem cylindrical, nearly 1 ft. in diam.; branchlets glabrous or nearly so. Leaves from oblong and dentate to orbicular and entire, very variable in size, glabrous above, glabrous or pubescent beneath; petiole 6–18 lin. long. Cymes in terminal (rarely axillary) lax panicles; branches slender, glabrous, pseudodichotomous; pedicels 1 lin. long. Calyx tubular-campanulate, sparingly hairy outside, densely clothed with short hairs inside, 2 lin. long; lobes short, rounded. Corolla white; tube cylindrical, as long as the calyx; lobes 5, oblong, about 2 lin. long, obtuse or emarginate. Stamens inserted at the corolla-throat; filaments hairy a short distance above the base. Style-arms linear. Fruit ovoid, apiculate by the persistent style-base, 6 lin. in diam., seated on the enlarged widely campanulate calyx.—Jacq. Fragm. t. 103, fig. 3; Del. Fl. Égypte, 191, t. 19, figs. 1–2; Wight, Ill. t. 169; DC. Prodr. ix. 479; A. Rich. Tent. Fl. Abyss. ii. 82, partly; Benth. Fl. Austral. iv. 386; Hook. f. Fl. Brit. Ind. iv. 136; Hallier f. in Bull. Herb. Boiss. vi. 717. *C. Sebestena*, Forsk. Fl. Ægypt.-Arab. lxiii. not of others. *C. africana* and *C. officinalis*, Lam. Ill. i. 420, t. 96. *C. domestica*, Roth, Nov. Pl. Sp. 123. *Argyreia arborea*, Lour. Fl. Cochinch. 135.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; between Lupata and Sena, *Kirk!* British Central Africa: Nyasaland; Karonga, *Scott!* Boruma on the Zambesi, *Menyharth*, 866!

Also in Egypt, Madagascar, Tropical Asia, and Queensland.

20. **C. Heudelotii,** *Baker in Kew Bulletin*, 1894, 27. Very near *C. Myxa*. Branchlets glabrous. Leaves alternate, oblong, acute, 3–4 in. long, $1\frac{1}{6}$–2 in. broad at the middle, thin not at all scabrid above, glabrous beneath; lateral nerves 5–7 on each side; petiole slender, glabrous, 1–$1\frac{1}{2}$ in. long. Cymes terminal and axillary, lax, ample. Calyx funnel-shaped, glabrous, $\frac{1}{4}$ in. long; teeth 4, small, ovate. Corolla-limb 3 lin. in diam.; lobes 4, oblong, obtuse, twice as long as the tube. Stamens inserted in the corolla-throat and shorter than the lobes; filaments hairy in the lower part. Ovary conical; style-arms very short. Fruit ovoid, 6 lin. long, 4 lin. in diam., seated upon the enlarged hardened broadly campanulate calyx.

Upper Guinea. Senegambia, *Heudelot!* Lagos: Yoruba forests, *Barter*, 3425!

21. **C. Zedambæ,** *Martelli, Florul. Bogos.* 58.—A small tree or shrub. Branchlets slender, glabrous. Leaves alternate, oblong, acute, 2–3 in. long, 1–1½ in. broad at the middle, narrowed gradually to the apex and base, thin, not scabrid above, slightly hairy on the nerves on both surfaces. Petiole 6 lin. long, pilose. Cymes lax, terminal, shortly peduncled. Calyx urceolate, 3 lin. long, not sulcate, glabrous outside, densely pubescent inside; limb scarious, irregularly toothed. Corolla-tube cylindrical, 3 lin. long; lobes 4–5, oblong, obtuse, 2½ lin. long, recurved. Stamens inserted in the corolla-throat, ½ lin. long, slightly hairy below. Ovary oblong; style-arms linear. Drupe unknown.

Nile Land. Eritrea: Shotel, on the slopes of Zedamba (Tsad Ambu) *Beccari*, 115!

22. **C. senegalensis,** *Juss. in Lam. Encycl.* vii. 46.—A tree about 20 ft. high; branches terete, blackish, glabrous. Leaves ovate or elliptic, acuminate, subacute at the base, 2½ in. long, 1 in. wide, glabrous on both surfaces (scabrid, *DC.*), entire; petiole glabrous, 2 in. long. Panicles short, subracemose, terminal on short branches; pedicels short; flowers 4-merous. Calyx ovoid-oblong, 2½ lin. long, smooth, coriaceous. Corolla salver-shaped; lobes oblong. Stamens shorter than the corolla-lobes. Fruit ovoid, apiculate by the persistent style-base.—DC. Prodr. ix. 480.

Upper Guinea. Senegal, *Adanson, Perrottet.*

Var. *Pelida,* A. DC. in DC. Prodr. ix. 480. Leaves 2–3 in. long, 15–18 lin. wide, rather obtuse at the base, entire or remotely crenate-dentate at the apex; petiole 4 lin. long. Flowers unknown. Fruit ovoid, acute, 4–6 lin. long, surrounded in its lower half by the widely campanulate crenate-dentate calyx.—*C. Pelida,* Perrott. ex A. DC. l.c.

Upper Guinea. Senegal, *Perrottet.*

23. **C. Mannii,** *C. H. Wright.*—A tree 30 ft. high; branchlets glabrous. Leaves ovate-lanceolate, acuminate, 5½ in. long, 1½–2 in. wide, membranous, glabrous, cuneate at the base; petiole slender, up to 1½ in. long. Panicles at or near the apex of the branchlets: flowers polygamous. Calyx tubular, 2 lin. long, glabrous; lobes 3, broad, obtuse. Corolla-tube narrowly funnel-shaped, 1½ in. long; lobes 4, oblong or almost spathulate, reflexed, 2½ lin. long. Stamens inserted in the corolla-throat; filaments 2 lin. long, hairy in the lower half; anther-cells distinct below. Ovary in male flower rudimentary and globose, in hermaphrodite flower conical; style divided about halfway down, ultimate branches long, linear.—*Ehretia acutifolia,* Baker in Kew Bulletin, 1894, 28.

Upper Guinea. Cameroons: Ambas Bay, *Mann,* 768! Johann Albrechtshöhe *Staudt,* 614! Bipinde, *Zenker,* 1332! 1681!

24. **C. ovalis,** *R. Br. in Salt, Abyss. Append.* 64.—A shrub or small tree; branchlets, peduncles, petioles and undersurface of leaves fulvo-pubescent. Leaves ovate, obovate or suborbicular, 2–3 in. long,

subcoriaceous, scabrid above, entire or slightly crenate; lateral nerves 4–5 on each side; petiole 6–12 lin. long. Panicle terminal, dense, shorter than the leaves; flowers polygamous. Calyx tubular, 4 lin. long, irregularly toothed, not sulcate, pubescent outside. Corolla-tube cylindrical, $2\frac{1}{2}$ lin. long; lobes 4–5, obovate, obtuse, $2\frac{1}{2}$ lin. long. Stamens inserted in the corolla-throat; filaments $\frac{3}{4}$ lin. long, glabrous. Ovary ovoid; style bipartite nearly to the base; ultimate segments linear, 3 lin. long.—DC. Prodr. ix. 479; Gürke in Engl. and Prantl, Pflanzenfam. iv. 3A. 83. *C. rubra*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 82; Hiern in Cat. Afr. Pl. Welw. i. 712. *C. Myxa*, A. Rich. l. c. partly, not of Linn.

Nile Land. Eritrea: Barasio Valley, 4900 ft., *Schweinfurth & Riva*, 709! Keren, *Beccari*, 162! Abyssinia: near Gafta, *Schimper*, 1218! near Jelajeranne, *Schimper*, 1582! Somak, Efat, *Roth*, 124 (429)! Darfur: Gebel Serg, *Pfund*, 467! British East Africa: Tola (Tula) River, *Kirk!* Kibwezi, *Kässner*, 711! Makindu, *Kässner*, 560!

Lower Guinea. Angola: hilly places near Barra do Dande and along the coast as far as the mouth of the River Cuanza, *Welwitsch*, 5423! Golungo Alto district, *Welwitsch*, 5431! Hereroland, ex *Gürke*.

25. **C. Stuhlmannii,** *Gürke in Engl. Pfl. Ost-Afr. C.* 335. A tree or shrub; branchlets puberulous. Leaves lanceolate or ovate-lanceolate, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, 7–12 lin. broad, acuminate, narrowed to the base, entire or denticulate, thinly coated above, densely beneath, with adpressed hairs; petiole 5–9 lin. long. Flowers monoicous or dioicous, arranged in lax few-flowered cymes; pedicels short. Calyx of male flowers cup-shaped, pubescent; teeth 3–5, unequal, obtuse, deltoid, Corolla-tube as long as the calyx, with long hairs at the throat; lobes 4, oblong-lanceolate, obtuse. Stamens 4; filaments exserted from the corolla-tube.—Gürke in Engl. Jahrb. xxviii. 308.

Mozamb. Dist. Portuguese East Africa: Quilimane, *Stuhlmann*, i. 399.

26. **C. dioica,** *Bojer ex DC. Prodr.* ix. 481. A tree; branchlets slender, scabrid. Leaves alternate, obovate or suborbicular, obtuse or obtusely cuspidate, $2\frac{1}{2}$–4 in. long, very scabrid above when mature, more or less pubescent beneath; petiole 1–2 in. long. Cymes polygamous, small, dense, terminal; branchlets scabrid. Calyx funnel-shaped, pubescent outside, 3 lin. long, not sulcate; lobes 4–5, short, ovate. Corolla-tube cylindrical, as long as the calyx; lobes oblong-lanceolate, obtuse, $2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad. Stamens inserted in the corolla throat; filaments $1\frac{1}{2}$ lin. long, shortly hairy in the part adnate to the corolla. Fruit oblong, apiculate, seated upon the enlarged woody cup-shaped calyx.—Vatke in Linnæa, xliii. 315.

Mozamb. Dist. British East Africa: Pemba Island, *Bojer*, Taita; Ndi, *Hildebrandt*, 2846! Zanguebar, *Kirk!*

27. **C. crenata**, *Del. Fl. Égypte*, 195, *t.* 20, *not of Roem. & Schult.* A low tree; branchlets slender, pubescent when quite young. Leaves obovate-cuneate, obtuse, 2–3 in. long, $1\frac{1}{2}$ in. wide, firm, scabrid above,

pubescent beneath, crenate or entire in the upper half ; lateral nerves about 5 on each side ; petiole 4–6 lin. long, pubescent. Cymes few-flowered. Calyx tubular-campanulate, 4 lin. long, not sulcate, slightly pubescent outside, densely silky inside and on the margins ; lobes broadly ovate, acuminate, scarious. Corolla-tube cylindrical, $3\frac{1}{2}$ lin. long ; lobes 5, obovate, obtuse, $2\frac{1}{2}$ lin. long. Filaments much shorter than the corolla-lobes, hairy below. Ovary ovoid, gradually tapering upwards ; style deeply bipartite ; ultimate branches linear, $2\frac{1}{2}$ lin. long. Fruit ovoid, 6 lin. long, seated upon the enlarged woody campanulate crenately toothed calyx.—DC. Prodr. ix. 479. *C. senegalensis*, var. *Pelida*, Hochst. in Schimp. Exsicc, 2180, not of DC. *C. obovata*, Baker in Kew Bulletin, 1894, 28, not of Balf. f. *C. Bakeri*, Britten in Journ. Bot. 1895, 88.

Nile Land. Abyssinia : Samen ; near Jaja, *Schimper*, 2180 ! and without precise locality, *Schimper*, 192 ! Blue Nile, near Sheikh Talha Village, *Muriel*, L82 !

Also in Egypt.

This is very closely allied to that state of *C. Rothii*, Roem. & Schultes, described by Klotzsch as *C. quercifolia*.

28. **C. guineensis,** *Thonn. in Schumach. & Thonn. Beskr. Guin. Pl.* 128. A shrub 6 ft. high or rather more, very much branched, erect ; branches terete, scabrid-pubescent. Leaves alternate, elliptic, obtuse with a reflected mucro, subentire, shortly scabrid, 2–3 in. long, the younger remotely denticulate ; veins prominent beneath ; petiole short, terete. Panicle axillary, shortly corymbose ; peduncle as long as the petiole ; flowers polygamous. Hermaphrodite flowers : Calyx tubular, constricted at the mouth, striate-rugose, slightly pubescent outside, densely silky tomentose within ; teeth 5, setaceous, marcescent. Corolla salver-shaped, pale yellow, opening at night, sweet-smelling ; tube as long as the calyx ; lobes 5, oblong, obtuse, recurved. Stamens 5 ; filaments adnate to the middle of the corolla-tube and scarcely longer than it in the hermaphrodite flowers, as long as the lobes in the male, pubescent. Ovary ovoid, glabrous, tapering into a style as long as the corolla. Fruit as large as a gooseberry, ovoid, subacuminate, glabrous, surrounded nearly to the middle by the calyx, 1-seeded.—DC. Prodr. ix. 480.

Lower Guinea. Guinea : by the sea-shore, *Thonning*.

29. **C. quarensis,** *Gürke in Engl. Pfl. Ost-Afr. C.* 335. A small tree ; branchlets subtomentose or pubescent. Leaves broad ovate, obtuse, $2–2\frac{3}{4}$ in. long, $1\frac{1}{2}–2\frac{1}{4}$ in. broad, rounded at the base, obsoletely toothed or entire, scabrid above, pubescent beneath ; petiole 4–9 lin. long. Flowers dioicous, arranged in few-flowered cymes, 3–4 of which form a panicle. Calyx of male flowers between campanulate and turbinate, about 4 lin. long, tomentose outside ; teeth 3–5, unequal, deltoid. Corolla pale yellow, twice as long as the calyx. Stamens shorter than

the corolla.—Gürke in Engl. Jahrb. xxviii. 308; Merker in Notizbl. Königl. Bot. Gart. Berlin, iii. 197.

Mozamb. Dist. German East Africa: Kilimanjaro; by the Quare brook, *Volkens*, 2040, 2045; Uzinja; Usambiro, *Stuhlmann*, 845.

30. **C. pilosissima,** *Baker in Kew Bulletin*, 1894, 28. A tree 8–15 feet high; branchlets densely pilose when young. Leaves ovate or suborbicular, up to 5 by $3\frac{1}{2}$ in., rounded at the base, obtuse, entire, or obscurely crenate, densely tomentose on both surfaces; lateral nerves 5–7 on each side; petiole 1 in. long, densely pilose. Cymes terminal, dense, many-flowered; branches densely pilose; flowers polygamous. Calyx tubular-campanulate, 3–5 lin. long, densely pilose outside, pubescent inside, not sulcate; lobes small, unequal, ovate. Corolla whitish-violet (*Welwitsch*); tube 3–6 lin. long, cylindrical; lobes 4–5, spreading obovate, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, undulate. Stamens inserted in the corolla-throat; filaments 1 lin. long, hairy in the lower part. Ovary in male flower rudimentary, globose, in hermaphrodite ovoid; style divided about halfway down; ultimate branches $2\frac{1}{4}$ lin. long, linear. Fruit ovoid, acuminate, about 1 in. long; calyx 7 lin. long, 9 lin. in diam., slightly ribbed, coriaceous.—Hiern in Cat. Afr. Pl. Welw. i. 713. *C. Kirkii*, Baker, l.c.

Lower Guinea. Angola: Bumbo; in open forests at the foot of the Chella Mountains, near Bruco, *Welwitsch*, 4784!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Tete, *Kirk!* Shigogo, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 853!

31. **C. somaliensis**, *Baker in Kew Bulletin*, 1894, 28. A tree; final branchlets slender, densely coated with short whitish pubescence. Leaves oblanceolate-oblong, obtuse, entire, 2–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. broad, cuneate at the base, penninerved, subcoriaceous, slightly pubescent and scabrid above when mature, densely clothed with short drab pubescence beneath; petiole not above $\frac{1}{4}$ in. long. Cymes dense, very compound, terminal, shortly peduncled; branchlets very hairy. Calyx 3 lin. long, ovoid, pilose but glabrescent outside, persistently silky pubescent inside; teeth short, unequal, acute. Corolla-tube cylindric, 3 lin. long; lobes oblong, obtuse, $2\frac{1}{2}$ lin. long. Filaments inserted in the corolla-throat, 1 lin. long, slender, glabrous. Ovary ovoid, tapering upwards; style-arms linear, $1\frac{1}{4}$ lin. long.

Nile Land. British East Africa: Kismayo (Kismayu), near the mouth of the River Jub, *Kirk!* Not from Kisinga as originally quoted.

32. **C. Rothii,** *Roem. & Schultes*, *Syst. Veg.* iv. 798. A shrub or tree up to about 16 ft. high; branches often bearing lenticels. Leaves sub-opposite, oblanceolate or oblong, obtuse, very variable in size, averaging 3 by $1\frac{1}{4}$ in., sometimes rather unequal at the base, scabrid above, pubescent beneath; petiole 3–6 lin. long. Cymes terminal; branches and outside of calyx more or less hairy; pedicels 1–2 lin. long. Calyx oblong-campanulate, 2 lin. long, membranous and obscurely lobed at the apex. Corolla white; tube cylindric, a little longer than the

calyx; lobes oblong, obtuse, $1\frac{1}{2}$ by $\frac{3}{4}$ lin. Stamens inserted in the corolla-throat, glabrous. Style-arms narrowly clavate. Fruit ovoid, apiculate by the persistent style-base, seated upon the accrescent saucer-shaped calyx, reddish.—DC. Prodr. ix. 480; Wight, Ic. t. 1379; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 138. *C. reticulata*, Roth ex Roem. & Schultes, Syst. Veg. iv. 454, not of Vahl. *C. oblongifolia*, Hochst. ex DC. Prodr. ix. 480, in obs., not of Thw. *C. subopposita*, DC. Prodr. ix. 480; A. Rich. Tent. Fl. Abyss. ii. 81; Schweinf. Beitr. Fl. Aethiop. 118; Hiern in Cat. Afr. Pl. Welw. i. 713. *C. quercifolia*, Klotzsch in Peters, Reise Mossamb. Bot. 247, t. 43. *C. Gharaf*, Ehrenb. ex Aschers. in Sitz.-ber. Naturf. Fr. Berlin, 1879, 46, and in Sitz.-ber. Bot. Ver. Brandenb. xxi. 69; Engl. Hochgebirgsfl. Trop. Afr. 351; Gürke in Engl. Jahrb. xxviii. 461, and in Warb. Kunene-Samb. Exped. 347. *Cornus Gharaf*, Forsk. Fl. Ægypt.-Arab. xcv. *C. sanguinea*, Forsk. l.c. 33, not of Linn.

Upper Guinea. Togo: near Lome, *Warnecke*, 344! Northern Nigeria: North Bornu at Yo, *Elliot*, 149!

Nile Land. Nubia: between Atbara and the Red Sea, *Schweinfurth*, 1492! Eritrea: Ailet, *Ehrenberg!* Mount Zibo, near Saati, *Schweinfurth & Riva*, 523! Abyssinia: by the River Tacazze, *Schimper*, 789! near Gageros, *Schimper*, 2283! Kordofan: Katul Gombara, *Pfund*, 207! White Nile: Om Mussot, *Schweinfurth*, 999! 1004! Gazelle River: *Schweinfurth*, 1176! British East Africa: Taita; Ndi, *Hildebrandt*, 2845! near Mombasa, *Hildebrandt*, 1969!

Lower Guinea. Angola: Barra de Bengo; dry hilly places between Teba and Cacuaco, *Welwitsch*, 5421! Loanda; maritime thickets near Maianga d'El Rei, *Welwitsch*, 5422! 5468!

Mozamb. Dist. German East Africa: Uhehe; by the Ruaha River, *Goetze*, 432! Portuguese East Africa: Lower Zambesi, Tete, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 874!

Also extends through Arabia into India.

2. EHRETIA, Linn.; Benth. et Hook. f. Gen. Pl. ii. 840.

Flowers hermaphrodite or polygamous. Calyx small, campanulate, deeply (usually 5-) cleft. Corolla-tube campanulate or funnel-shaped, shorter or longer than the 4–7 oblong imbricate patent lobes. Stamens 4–7, inserted at or below the throat of the corolla-tube; filaments filiform; anthers versatile. Ovary 2–4-celled; style terminal; subulate, bifid; stigmas capitate, terminal; ovules attached laterally. Drupe small, globose; endocarp hard; pyrenes 2, 2-celled or 4, 1-celled. Seeds with little albumen; cotyledons plicate.—Trees or shrubs. Leaves alternate, entire or dentate, smooth or scabrid, penninerved. Flowers small, usually arranged in very compound terminal dichotomous cymes with scorpioid branchlets.

Species about 50, spread through the warmer regions of both hemispheres.

Owing to the fruit of very many of the Tropical African species being unknown, it is not possible to arrange them under the sections adopted by Bentham and Hooker and other authors.

Ehretia triphylla, Hochst. in Flora, 1844, 830, is *Clerodendron glabrum*, E. Meyer.

* Corolla shortly exserted from the calyx, campanulate.
Leaves conspicuously scabrid above . . . 1. *E. teitensis.*
Leaves not scabrid above.
Leaves glabrous beneath.
Inflorescence terminal . . . . . 2. *E. petiolaris.*
Inflorescence axillary or terminal on short branches . . . . . 3. *E. gurkeana.*
Leaves pubescent beneath . . . . 4. *E. litoralis.*
** Corolla at least 3 times as long as the calyx.
Flowers 4-merous . . . . . 5. *E. tetrandra.*
Flowers 5-merous.
Corolla 5 lin. long . . . . . 6. *E. longistyla.*
Corolla 3-4 lin. long.
Leaves glabrous.
Branches of inflorescence glabrous . . 7. *E. Bakeri.*
Branches of inflorescence puberulous . . 8. *E. angolensis.*
Branches of inflorescence pilose.
Panicle terminal . . . . . 9. *E. abyssinica.*
Panicle leaf-opposed . . . . 10. *E. silvatica.*
Leaves hairy.
Upper surface of leaves sparingly hairy . 11. *E. Braunii.*
Upper surface of leaves densely hairy.
Leaves toothed at the apex . . . 12. *E. amœna.*
Leaves entire.
Calyx-lobes lanceolate, acuminate; corolla rose-red . . . . 13. *E. rosea.*
Calyx-lobes lanceolate, acute; corolla blue . . . . . 14. *E. cærulea.*
Calyx-lobes ovate-lanceolate, obtuse; corolla whitish . . . . 15. *E. obtusifolia.*
*** Corolla less than 3 times as long as the calyx, not campanulate.
Branches of inflorescence densely pilose . . 16. *E. Zenkeri.*
Branches of inflorescence pubescent.
Leaves glabrous.
Calyx glabrous or nearly so; corolla about 1 lin. long . . . . . 17. *E. cymosa.*
Calyx puberulous; corolla about 2 lin. long.
Leaves rounded or subcordate at the base . 18. *E. scrobiculata.*
Leaves deltoid at the base . . . 19. *E. divaricata.*
Leaves hairy.
Flowers 6–7-merous . . . . . 20. *E. Gœtzei.*
Flowers 5-merous.
Stamens much exserted . . . . 21. *E. Stuhlmannii.*
Stamens scarcely exserted.
Leaves oblong, acute . . . . 22. *E. uhehensis.*
Leaves obovate, obtuse . . . . 23. *E. Fischeri.*

1. **E. teitensis,** *Gürke in Engl. Pfl. Ost-Afr. C.* 336. A shrub 16–20 ft. high, with whitish pubescent branchlets. Leaves obovate-cuneate, obtuse, 1–1½ in. long, rigidly coriaceous, scabrid above, pubescent beneath when young, finally subglabrous; petiole very short. Cymes few-flowered, forming small terminal panicles; pedicels very short, pubescent. Calyx 1½ lin. long, densely pubescent; lobes oblong,

acute, rather longer than the campanulate tube. Corolla campanulate, 5 lin. in diam.; tube 1 lin. long; lobes slightly longer than the tube. Stamens $\frac{3}{4}$ lin. long; anther-cells divergent at the base. Ovary conical; style about 1 lin. long, very shortly bifid.

Nile Land. British East Africa: Ruwenzori; Toru, *Scott-Elliot*, 6172 partly! Taro Hill, near Mombasa, *Kässner*, 495A! Umba Valley, *Smith!* Taita, *Hildebrandt*, 2359, 2598.

Mozamb. Dist. German East Africa: Usambara; Nyika Steppe, *Holst*, 2409!

2. **E. petiolaris,** *Lam. Encycl.* i. 527. A shrub 5–8 ft. high; bark greyish, rough. Leaves oval, obtuse or acute, rounded or acute at the base, up to $4\frac{1}{2}$ by $2\frac{1}{2}$ in., entire, glabrous; petiole up to 2 in. long, slender. Panicles terminal, lax; branches glabrous. Calyx $1\frac{1}{2}$ lin. long, glabrous except on the margins; teeth 5, deltoid, about as long as the tube. Corolla broadly campanulate; tube $2\frac{1}{4}$ lin. long, glabrous; lobes 5, rounded, $\frac{1}{2}$ lin. long. Stamens inserted about the middle of the corolla-tube, included, glabrous. Ovary conical; style $1\frac{1}{2}$ lin. long, very shortly bifid; stigmas capitate.—DC. Prodr. ix. 504; Baker, Fl. Maurit. 201; Engl. Pfl. Ost-Afr. C. 336. *E. internodis*, L'Herit. Stirp. 47, t. 24. *Cordia petiolata*, Hort. Par. ex Lam. l.c. *Hilsenbergia Ehretia*, Tausch, and *H. rugosa*, Dunal in DC. Prodr. xiii. i. 478.

Nile Land. British East Africa: Mombasa and vicinity, *Kirk! Wakefield!* Malindi, at the mouth of the River Sabaki, *Kirk!* Witu, *Thomas*, 197!

Mozamb. Dist. German East Africa: Usambara Muoa, *Holst*, 3077!

Also in Mauritius and Madagascar.

3. **E. gurkeana,** *De Wild. in Études Fl. Katanga*, iii. 223.—A tree; young branches pubescent, becoming glabrous, bark grey. Leaves elliptic, acute at each end, entire, membranous, glabrous on both surfaces or with scattered hairs on the upper side of the nerves, $1\frac{1}{2}$–3 in. long, 6–12 lin. wide, petioled. Cymes in the axils of the upper caducous leaves or terminating short branches, peduncled, lax, about 2 in. long; pedicels slender, 1–2 lin. long, sparingly pubescent. Calyx cup-shaped, disarticulating at the base, about 2 lin. long, glabrescent; teeth 5, obtusely triangular. Corolla deeply 5-lobed, about twice as long as the calyx. Stamens about as long as the corolla-lobes. Ovary glabrous; style glabrous; stigma 2-lobed. Fruit unknown.

South Central. Congo Free State: Katanga; Lukafu, *Verdick*, 308.

4. **E. litoralis,** *Gürke in Engl. Pfl. Ost-Afr. C.* 335.—A shrub; branches pubescent above. Leaves elliptic, obtuse or subacute, acute at the base, 3 in. long, $1\frac{1}{2}$ in. wide, glabrous above or pubescent on the nerves only, pubescent below; petiole 1 in. long. Panicles in the axils of the upper leaves, lax, few-flowered; peduncles long. Calyx 2 lin. long, densely pubescent outside; lobes 5, deltoid, acute, as long as the tube. Corolla campanulate, a little longer than the calyx; lobes 5, short, rounded. Stamens inserted about the middle of the corolla-tube, included; filaments glabrous. Ovary conical, glabrous; style simple,

1 lin. long; stigma 2-lobed. Fruit enclosing 4 pyrenes.—Engl. Jahrb. xxviii. 310. *E. nemoralis*, Gürke, ll. cc. 336, 310.

Mozamb. Dist. German East Africa: Usambara; Tanga, *Volkens*, 198, *Holst*, 2115! in the bush on hills near Amboni, *Holst*, 2814! near Pangani, *Stuhlmann*, ser. i. 171: near Bagamoyo, *Stuhlmann*, 204; near Dar-es-Salaam, *Stuhlmann*, 6077, 6647, 6663, 6672, 6679, 7085, 7161.

5. **E. tetrandra,** *Gürke in Engl. Jahrb.* xxviii. 311, 461.—A shrub, about 7 ft. high. Leaves broadly ovate, acuminate, cordate at the base, 1½–2½ in. long, entire or irregularly toothed, membranous, pubescent on both surfaces; petiole 4–6 lin. long. Cymes lateral, few-flowered; peduncle short, covered (as well as the pedicels) with short brown hairs. Calyx campanulate, finely hairy outside, 1 lin. long; teeth 4, rotundate, slightly longer than the tube. Corolla yellow; tube 1¾ lin. long, tubular-campanulate, densely hairy at the throat; lobes 4, elliptic, obtuse, 1½ lin. long. Stamens 4; filaments ¾ lin. long; anthers shortly ovate. Ovary globose, papillate; style 2½ lin. long, bifid only at the apex.

Mozamb. Dist. German East Africa: Usagara; beneath overhanging rocks by the Ruaha River, 2000–2500 ft., *Goetze*, 471!

6. **E. longistyla,** *De Wild. & Durand, Contrib. Fl. Congo*, i. 43. A shrub 3–5 ft. high; branchlets pubescent in the upper part. Leaves elliptic, acute or abruptly acuminate, obtuse at the base, entire, membranous, glabrous or pubescent on the main veins above, glabrous except for tufts of hair in the axils of the secondary veins beneath; petiole 4–6 lin. long. Cymes lax, many-flowered, terminal and lateral; peduncle long; pedicels short; bracts oblanceolate, 1½–3 in. long. Calyx 5-lobed to the base; lobes deltoid, acute, 1½ lin. long, ciliate on the margin. Corolla blue-violet; tube campanulate, twice as long as the calyx, glabrous; lobes round-deltoid, obtuse, 2 lin. long. Stamens much exserted. Ovary glabrous; style 3–4 lin. long; stigma 2-lobed. Pyrenes 4.

Lower Guinea. Lower Congo: Boma, *Dewèvre*.

7. **E. Bakeri,** *Britten in Journ. Bot.* 1895, 88. A shrub or small tree; branchlets glabrous, lenticellate. Leaves ovate-oblong, acute, 6–8 in. long, 3¼ in. wide, deltoid at the base, subcoriaceous, glabrous on both surfaces; petiole 9 lin. long, channelled above. Cymes small, many-flowered, terminal on the glabrous or puberulous branchlets; pedicels very short. Calyx pubescent outside, 5-partite; segments lanceolate, acute, 1 lin. long, ⅓ lin. wide. Corolla-tube cylindrical, 2 lin. long, 1 lin. in diam.; lobes oblong, rounded and ciliate at the apex, 1½ lin. long, ¾ lin. wide. Stamens inserted in the corolla-throat; filaments slightly shorter than the corolla-lobes, glabrous. Ovary conical; style 2½ lin. long (including the ½ lin. long obtuse arms). Fruit enclosing 4 separable pyrenes.—*E. macrophylla*, Baker in Kew Bulletin, 1894, 29, not of Wallich.

Mozamb. Dist. German East Africa: Usaramo; Dar-es-Salaam, *Kirk*, 120! 124!

8. **E. angolensis,** *Baker in Kew Bulletin*, 1894, 29. A shrub 4–6 ft. high, branched from the base; branches glabrous. Leaves oblong, shortly acuminate, 3–4 in. long, 1¼–2 in. wide, coriaceous, evergreen, pallid beneath; petiole 3–6 lin. long. Panicles terminal, many-flowered; branches puberulous. Calyx campanulate, 1 lin. long, 5-partite; lobes ovate, ciliate. Corolla blue (*Welwitsch*), funnel-shaped; tube 2½ lin. long; lobes shorter than the tube, oblong, obtuse, recurved. Stamens inserted in the corolla-throat; filaments about as long as the corolla-lobes, glabrous. Ovary ovoid; style 3 lin. long, arms linear; stigmas more or less capitate. Fruit deep orange, the size of a small pea; pyrenes 4.—Hiern in Cat. Afr. Pl. Welw. i. 716.

Lower Guinea. Angola: Ambriz, *Monteiro!* Loanda: in thickets about Loanda, Cacuaco, and Quifandongo, *Welwitsch*, 5444! at Quicuxe, *Welwitsch*, 5463! Libongo: in thickets about Banza de Libongo, *Welwitsch*, 5446.

9. **E. abyssinica,** *R. Br. in Salt, Abyss. Append.* lxiv., *name only.* A small tree; branchlets glabrous or slightly hairy. Leaves elliptic-oblong, shortly acuminate or obtuse, acute or rounded at the base, entire, glabrous except for tufts of hairs in the axils of the nerves beneath, 2½–5 in. long, 1¼–2½ in. wide; petiole 6 lin. long, glabrous or slightly hairy. Panicle terminal, 3–5 in. across; branches more or less pilose. Calyx pubescent outside, 1 lin. long; lobes ovate, acute, ciliate. Corolla white; tube campanulate, 1½ lin. long; lobes ovate-oblong, obtuse, 2½ lin. long, 1¼ lin. broad. Stamens inserted in the corolla-throat; filaments as long as the corolla-lobes; anthers oblong. Ovary ovoid; style 2½ lin. long, arms short, obtuse. Fruit 3 lin. in diam.—Fres. in Flora, 1838, 608; DC. Prodr. ix. 506; A Rich. Tent. Fl. Abyss. ii. 82; Engl. Hochgebirgsfl. Trop. Afr. 351.

Nile Land. Eritrea: Ginda, 2900–3400 ft., *Schweinfurth & Riva*, 2179! Abyssinia: near Jelajeranne, *Schimper*, 1907! near Adowa, *Schimper*, 307! Efat, *Roth*, 430! Begemeder Province, *Schimper*, 1442! and without precise locality, *Parkyns! Quartin Dillon & Petit*, 62!

10. **E. silvatica,** *Gürke in Engl. Jahrb.* xix. *Beibl.* 47, 46. A shrub or tree; branches pubescent or puberulous above. Leaves ovate, acute or acuminate, obtuse at the base, entire, glabrous above, puberulous beneath, 3–6 in. long, 1½–3½ in. wide; petiole 4–9 lin. long. Panicles leaf-opposed; flowers sessile or shortly pedicellate. Calyx 5-partite; lobes deltoid-lanceolate, acute, 1 lin. long. Corolla white, 3–4 lin. long; lobes lanceolate, obtuse. Stamens longer than the corolla. Ovary puberulous or glabrescent; style about 2 lin. long, bifid, glabrous. Fruit yellowish-red.

Mozamb. Dist. German East Africa: Usambara; Handei at Kwa Mshuza, *Holst*, 9067! and without precise locality, *Buchwald*, 164! 168! Kilimanjaro: Marangu, 5000 ft., *Volkens*, 1470.

11. **E. Braunii,** *Vatke in Linnæa*, xliii. 315. A solitary tree, about 30 ft. high; bark greyish, striate; branchlets glabrous. Leaves oval or obovate-oblong, very obtuse or emarginate, attenuate at the base, about 1 in. long and 9 lin. wide, quite entire, slightly coriaceous, above

sparingly setose, beneath and on margin more so; petiole 2 lin. long. Panicle terminal; branches minutely reddish tomentose; pedicels short. Calyx ¾ lin. long, puberulous outside; lobes oblong, obtuse, ciliate. Corolla-tube funnel-shaped, 2 lin. long; lobes reflexed, oblong, 1½ lin. long. Stamens shorter than the corolla; filaments glabrous. Ovary conical; style 3 lin. long, including the 1 lin. long arms.

Nile Land. Somaliland near Meid, in the region of Mount Ahl, about 3600 ft., *Hildebrandt*, 1517!

12. **E. amœna,** *Klotzsch in Peters, Reise Mossamb. Bot.* 248, *t.* 41. A shrub; branches erect, robust, terete, glabrous, ashy-white. Leaves obovate, truncate and coarsely crenate-toothed at the apex, attenuate into a short petiole, 2–2½ in. long, 10–15 lin. wide, dark green and scabrid above, hoary pubescent beneath. Panicles terminal on short branches, pubescent; ultimate branches racemose. Calyx 5-partite, pubescent, 1 lin. long; lobes ovate, acute. Corolla rotate, 3 lin. long; lobes 5, oblong, acute. Stamens 5, inserted in the corolla-throat and as long as the lobes; filaments compressed subulate, glabrous; anthers oblong, at the apex shortly, at the base deeply 2-lobed. Ovary oblong-globose, glabrous; style straight, cylindrical, 2-fid about a ¼-way down; stigmas incrassate, truncate, umbilicate. Fruit globose, glabrous, foveolate, enclosing two 2-celled, 2-seeded pyrenes.—Gürke in Engl. Pfl. Ost-Afr. C. 335; C. H. Wright in Dyer, Fl. Cap. iv. ii. 5. *E. mossambicensis,* Klotzsch, l.c. 249, t. 42; Gürke, l. c.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi: Tete, *Peters, Kirk!* Sena, *Peters.* British Central Africa: Matabeleland; near Enkeldorn, *Hon. Mrs. Evelyn Cecil,* 89! Ngamiland; Kwebe, *Lugard,* 36! 37! Kwebe Hills, 3400 ft., *Mrs. Lugard,* 48!

Also in South Africa.

13. **E. rosea,** *Gürke in Engl. Jahrb.* xxviii. 461. An erect shrub, 3–7 ft. high; bark grey; branches slender, terete, yellowish-grey tomentose. Leaves oblong or almost rhomboid, 1½–2½ in. long, obtusely or shortly cuspidate, narrowed to the base, coriaceous, quite entire, pubescent on both surfaces. Cymes lax, many-flowered. Calyx finely hairy, 1¼ in. long; teeth 5, lanceolate, acuminate, longer than the tube. Corolla rose-red; tube 2 lin. long; lobes 5, lanceolate, about half as long as the tube, ½ lin. wide, obtuse. Stamens 5, rather far exserted. Pistil 3 lin. long. Fruit globose, 4 "cm." (mm.?) in diam.

Mozamb. Dist. German East Africa: East Uluguru, Tununguo, 500–600 ft., *Stuhlmann,* 8713, and without precise locality, *Stuhlmann,* 8961.

14. **E. cœrulea,** *Gürke in Engl. Jahrb.* xxviii. 312, 461. A shrub about 13 ft. high; bark pale grey. Leaves very irregular in outline but more or less broadly obovate, about 2 in. long, 1½ in. wide, rounded to a small cusp at the apex or emarginate, narrowed to the base, entire, pubescent on both surfaces; petiole 3–6 lin. long, downy. Cymes many-flowered; branches densely pubescent; pedicels about 2 lin. long. Calyx 1¼ lin. long, pubescent, cut down nearly to the base; lobes 5,

lanceolate, acute. Corolla blue; tube 2 lin. long; lobes 5, lanceolate or oblong, obtuse, as long as the tube. Stamens 5, exserted. Ovary glabrous; style 2 lin. long, arms short, obtuse.

Nile Land. British East Africa: near Mazeras, 300 ft., *Kässner*, 282!

Mozamb. Dist. German East Africa: region of Lake Nyasa; Lukosse River, 2300 ft., *Goetze*, 484!

15. **E. obtusifolia,** *Hochst. ex DC. Prodr.* ix. 507. A small tree; branches terete, glabrous, greyish. Leaves obovate, $\frac{1}{2}$–2 in. long, obtuse or subacute, entire. Cymes at first appearing terminal, afterwards distinctly lateral; flowers shortly pedicelled. Calyx 1 lin. long, 5-partite, pilose outside; lobes ovate-lanceolate, obtuse. Corolla narrowly funnel-shaped, whitish (*Welwitsch*); tube $1\frac{1}{4}$ lin. long; lobes oblong, 2 lin. long, obtuse. Stamens inserted in the corolla-throat, as long as the corolla; filaments glabrous; anthers sagittate. Ovary subglobose; style 3 lin. long, divided about $\frac{1}{3}$-way down; stigmas subcapitate.—A. Rich. Tent. Fl. Abyss. ii. 83; Hook. f. Fl. Brit. Ind. iv. 142; Martelli, Florul. Bogos. 58; Hiern in Cat. Afr. Pl. Welw. i. 716. *E. obovata*, R. Br. in Salt, Abyss. Append. lxiv. name only.

Nile Land. Eritrea: near Acrur, 6200 ft., *Schweinfurth & Riva*, 1344! Selet Valley, below Saganeiti, 5500 ft., *Schweinfurth & Riva*, 1665! Bogos: Keren, 4500 ft., *Beccari*, 31! between Massowa and Adowa, *Quartin Dillon*. Abyssinia: near Gapdia, *Schimper*, 652! Efat, *Roth*, 104 (206)!

Lower Guinea. Angola: Bumbo, *Welwitsch*, 4785.

Also in Socotra, and from Arabia to Scinde and the Punjaub.

16. **E. Zenkeri,** *Gürke MSS.* Branchlets woody, densely pilose as well as the petioles and branches of the inflorescence. Leaves elliptic-oblong, 6 in. long, $3\frac{1}{2}$ in. wide, acute, subacute at the base, entire, glabrous above, sparingly pilose on the nerves beneath; petiole up to 2 in. long. Panicle terminal, lax; branches patent, densely pilose. Calyx nearly 1 lin. long, pubescent outside; lobes 5, ovate, as long as the tube. Corolla-tube 1 lin. long; lobes 5, oblong, obtuse, rather longer than the tube, reflexed. Stamens inserted in the corolla-throat, and slightly longer than the lobes. Ovary shortly oblong; style divided about $\frac{1}{3}$-way down, arms obtuse.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 2319!

17. **E. cymosa,** *Thonn. in Schumach. & Thonn. Beskr. Guin. Pl.* 129, *not of Willd.* A shrub; longer branches procumbent, shorter erect; branchlets subterete, glabrous. Leaves ovate or oblong, shortly acuminate, rounded at the base, entire, glabrous, up to 5 by 3 in., sometimes foveolate (but not hairy) in the nerve-axils beneath; petiole up to 9 lin. long, channelled above. Panicle terminal, many-flowered; branches divergent, pubescent. Calyx $\frac{3}{4}$ lin. long, glabrous or slightly pubescent; lobes oblong, acute, ciliate. Corolla white; tube wide, cylindrical, $\frac{1}{3}$ lin. long; lobes oblong, obtuse, $\frac{3}{4}$ lin. long, recurved. Stamens inserted in the corolla-throat, as long as the corolla; filaments subulate; anthers oblong. Style 1 lin. long, divided about $\frac{1}{3}$-way down.

Fruit enclosing 4 separable 1-seeded pyrenes.—DC. Prodr. ix. 508; A.DC. in Bull. Herb. Boiss. 2 sér. i. 581.

Upper Guinea: Sierra Leone: Talla hills, *Scott-Elliot*, 4856! 4920! Bafodeya Highlands, *Scott-Elliot*, 5645! near Bumban, *Scott-Elliot*, 5723! Liberia: Cape Palmas, *Vogel*, 20! Gold Coast: Accra, *Brown*, 372! *Vogel*! Aquapim, *Vogel*! Togo: near Lome, *Warnecke*, 82! 370! Lagos: Thaki, *Denton*, 24! Abeokuta, *Irving*, 52! Jasohe (Jaoke), *Irving*, 139! *Phillips*, 34! *Barter*, 3388! *Millen*, 98! *Punch*, 2! Interior, *Rowland*! Southern Nigeria: Aboh, *Barter*, 287! Cameroons: Rio del Rey, *Johnston*; Yaunde, *Zenker*, 1483! Bipinde, *Zenker*, 2119!

Lower Guinea. Princes Island, *Mann*, 1124!

Also reported from Madagascar.

18. **E. scrobiculata,** *Hiern in Cat. Afr. Pl. Welw.* i. 716. A small tree; branches virgate, patent or nodding; branchlets subterete, inconspicuously striate, glabrescent. Leaves alternate, shortly petioled, ovate or ovate-oblong, 5–6 in. long, 3–3½ in. wide, cuspidate, rounded or subcordate at the base, entire, glabrous or nearly so, thinly coriaceous; lateral nerves 7–8 on each side, with a small pit in each of the axils on the lower face; petiole 4–6 lin. long. Cymes 8 in. in diam., terminal; flowers sessile or shortly stalked, pilose-puberulous. Calyx campanulate, 1 lin. long, puberulous; lobes 5, deltoid. Corolla whitish, broadly funnel-shaped; tube as long as the calyx; lobes ovate, oblong, obtuse, 1½ lin. long, reflexed. Stamens 5; filaments as long as the corolla-lobes. Ovary ovoid.

Lower Guinea. Princes Island: maritime part of the island, in a wooded place, only one tree seen, *Welwitsch*, 5465!

19. **E. divaricata,** *Baker in Kew Bulletin*, 1894, 28. A small tree, with laxly thinly hairy branchlets. Leaves oblong, subobtuse, membranous, 3–4 in. long, smooth, glabrous except on the nerves, deltoid at the base; petiole short, slender. Cymes very lax and ample; branchlets slender, divaricate, pubescent; pedicels very short. Calyx puberulous; tube ¼ lin. long; segments narrowly lanceolate, acute. Corolla 3 lin. in diam.; tube short; lobes oblong, obtuse, 1½ lin. long. Stamens as long as the corolla-lobes; anthers oblong. Ovary conic; style about 1 lin. long, branches ¾ lin. long, obtuse. Drupe not seen.

Mozamb. Dist. British Central Africa: Nyasaland; near Chiradzulu (not Ischizadruaro, as originally quoted) Mountain, 3000 ft., *Kirk!*

20. **E. Gœtzei,** *Gürke in Engl. Jahrb.* xxviii. 311, 461. An erect shrub or tree 26–32 ft. high. Leaves shortly petioled, broadly ovate, 2½–3 lin. long, acute, narrowed to the base, entire, coriaceous, scabrid above, pubescent beneath. Cymes lax, many-flowered. Calyx 1½ lin. long; lobes 5, lanceolate, obtuse. Corolla white, 3 lin. long; lobes 6–7, lanceolate, obtuse, as long as the tube. Stamens 6–7, short; anthers lanceolate. Ovary glabrous; style short, thick.

Mozamb. Dist. German East Africa: Khutu; on thinly wooded steppes by the Mgeta River, near Kisaki, 500 ft., *Goetze*, 128!

21. **E. Stuhlmannii,** *Gürke in Engl. Pfl. Ost-Afr. C.* 336. A tree about 20 ft. high. Leaves broadly elliptic or obovate, 3–6 in. long, 2–4¾ in. wide, acute or rather obtuse, rounded or acute at the base, obscurely and remotely dentate, coriaceous, rough above, velvety pubescent beneath; petiole 3–6 lin. long, pubescent. Cymes in the axils of the upper leaves, lax, long peduncled; flowers very shortly pedicelled or sessile. Calyx 1½ lin. long, 5-lobed to just below the middle, pubescent outside; lobes deltoid, acute. Corolla-tube as long as the calyx; lobes 5, ovate, obtuse, reflexed. Stamens 5, long exserted; filaments glabrous. Ovary shortly oblong; style 2-lobed nearly to the middle.—Gürke in Engl. Jahrb. xxviii. 309.

Nile Land. British East Africa: Kilimanjaro Expedition, 40–60 miles from the coast, *Johnston!* Mombasa, *Kirk!*

Mozamb. Dist. German East Africa: Zanquebar, *Kirk!* near Mrogoro, *Stuhlmann*, 57! near Dar-es-Salaam, *Stuhlmann*, 6735, 7422! 7454, 7640, 7658! 7826, Nyika, between the Mtindi-Markt and Kwa Mkembe, *Volkens*, 35. Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* Tete, *Kirk*!

22. **E. uhehensis,** *Gürke in Engl. Jahrb.* xxviii. 462. An erect shrub; bark dull grey. Leaves oblong, 1½–3 in. long, 1–1¾ in. wide, acute, narrowed to the base, irregularly toothed upwards, pubescent; petiole 5–9 lin. long. Cymes lax, terminal, pubescent; bracts lanceolate-subulate, 1–2½ lin. long. Calyx 1½ lin. long, pubescent; teeth 5, ovate, short, obtuse. Corolla tubular, white; tube 2½ lin. long; lobes 5, lanceolate, obtuse, as long as the tube. Stamens scarcely exserted. Style about 3 lin. long.

Mozamb. Dist. German East Africa: Uhehe; lower mountain slopes by the Lofio River, 1900 ft., *Goetze*, 444.

23. **E. Fischeri,** *Gürke in Engl. Pfl. Ost-Afr. C.* 336. A shrub or small tree. Leaves obovate, obtuse, narrowed to the base, 1¼ in. long, 9 lin. broad, entire, velvety on both sides; petioles short. Cymes in the axils of the upper leaves, lax, few-flowered; branches glandular; pedicels about 2 lin. long. Calyx 1 lin. long, glandular-pubescent, divided nearly to the base; lobes 5, lanceolate. Corolla divided to about the middle, glabrous outside; tube twice as long as the calyx; lobes 5, lanceolate, obtuse. Stamens as long as the corolla-lobes; filaments glabrous. Style 3 lin. long; branches 1 lin. long.—Engl. Jahrb. xxviii. 313.

Mozamb. Dist. German East Africa: Usmawo; Kagehi (Kageyi), *Fischer*, 323; Usinja; near the French mission at Usambiro, *Stuhlmann*, 850.

3. **RHABDIA,** Mart.; Benth. et Hook. f. Gen. Pl. ii. 842.

Calyx campanulate, deeply 5-lobed; lobes ovate-lanceolate. Corolla-tube short, campanulate, naked in the throat; lobes 5, oblong, imbricate. Stamens 5, inserted near the base of the corolla-tube; filaments filiform; anthers oblong. Ovary ovoid, imperfectly 4-celled; style long, subulate, simple; stigmas 2-lobed, capitate; ovules pendulous. Pyrenes

4, enclosed in a membranous pericarp and thin pulp. Seed oblong; albumen scanty; embryo straight; cotyledons ovate, not plicate.

A single species, cosmopolitan in the tropics.

1. **R. lycioides**, *Mart. Nov. Gen. et Sp. Pl.* ii. 137, *t.* 195. A much-branched shrub, 3–6 ft. high; branchlets stiff, slender, hispid. Leaves oblanceolate-oblong, 1–1½ in. long, obtuse, entire, subcoriaceous, hispid, 1–1½ in. long. Flowers in sparse corymbs on short lateral branchlets. Calyx about 2 lin. long. Corolla twice as long as the calyx; lobes rather longer than the tube. Stamens half as long as the corolla. Drupe the size of a pea, glabrous, yellow or red-brown.—DC. Prodr. ix. 512; Fres. in Mart. Fl. Bras. viii. i. 58, t. 9, fig. 11; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 145. *R. viminea*, Dalz. ex Hook. Ic. t. 823. *Ehrhetia cuneata*, Wight, Ic. t. 1385. *Rotula aquatica*, Lour. Fl. Cochin. 121; DC. Prodr. ix. 531.

Upper Guinea. Senegambia: Mbidjem, *Thierry*, 217! and without precise locality, *Heudelot*, 116! Lagos: Yoruba, on the banks of streams, *Barter*, 1143! Sierra Leone: on rocks in the bed of the Niger at Farana, *Scott-Elliot*, 5339! by rivers on the way to Kukuna, *Scott-Elliot*, 4718!

Also in Tropical Asia and Brazil.

4. **COLDENIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 841.

Calyx deeply 4–5-lobed. Corolla-tube short, naked or with 4–5 scales in the throat; lobes 4–5, oblong, patent, imbricate. Stamens 4–5, included in the corolla-tube; filaments very short; anthers ovate. Ovary ovoid, 4-lobed, 4-celled, rarely 2-lobed. Styles 2, distinct from the base or slightly united below, subulate; stigmas capitate; ovules pendulous. Fruit dry or slightly succulent, separating into 4 1-seeded pyrenes; seeds with a very thin albumen; cotyledons broad, flat; radicle short, straight or curved.—Much-branched diffuse herbs. Leaves alternate, entire, dentate or lobed, often crisped or plicate. Flowers solitary in the axils of the leaves or the upper in secund leafy spikes, sessile or shortly pedicelled.

Species 10, all the others Western American.

1. **C. procumbens,** *Linn. Sp. Pl. ed.* i. 125. An annual herb; stems many, quite procumbent, hairy, radiating from the crown of the root. Leaves oblong, obtuse, deeply crenate, hairy on both sides, very plicate, cuneate at the base, shortly petioled, the lower 1 in. long, the upper often much smaller. Flowers solitary, nearly sessile in the axils of the leaves, the upper in leafy spikes. Calyx hairy, 1½ lin. long; segments 4, ovate-lanceolate. Corolla a little longer than the calyx, 4-lobed. Fruit mitre-like, depressed-globose, 2 lin. in diam., brown, glandular-hairy, irregularly asperous, laterally 4-lobed.—Lam. Ill. t. 89; Benth. Fl. Austral. iv. 391; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 144; Oliver in Trans. Linn. Soc. xxix. 114; Hiern in Cat. Afr. Pl.

Welw. i. 717; *C. angolensis*, Welw. Apont. Phyto-Geogr. 591. *Lobophyllum tetrandrum*, F. Muell. in Hook. Kew Journ. ix. 21.

Upper Guinea. Northern Nigeria: at the confluence of the Rivers Niger and Benue, *Barter*, 1672!

Nile Land. Sennar, *Kotschy*, 385! 471: "Ethiopia," *Kotschy*, 265! 383! Cordofan, *Pfund*, 415! Jur: Jur Ghattas, *Schweinfurth*, 2039! British East Africa: Madi, *Speke & Grant*!

Lower Guinea. Angola: Loanda district; by pools, *Welwitsch*, 5436! 5437! banks of the River Dande, near Bumbo, *Welwitsch*, 5445! by pools near Cacuaco in Barra do Bengo, *Welwitsch*, 5438!

Widely distributed in the tropics.

5. **POSKEA**, Vatke in Linnæa, xliii. 321.

Calyx-tube campanulate; lobes 5, erect, linear. Corolla-tube funnel-shaped; throat naked inside; lobes 5, small, oblong, imbricate. Stamens 5, or by abortion fewer; inserted high up in the corolla-tube, slightly exserted, filaments short, filiform; anthers small, subglobose, obtuse. Ovary globose, entire, imperfectly 4-celled; style long, simple, subulate, terminal; stigma small, capitate. Fruit and seeds not known.

A single endemic species.

1. **P. africana,** *Vatke, l.c.* A much-branched, erect shrub, with long slender hoary terete branchlets. Leaves alternate, suborbicular, entire, rigidly coriaceous, the lower only 3–6 lin. long; petiole very short. Flowers in dense terminal spikes 1–1½ in. long. Calyx hirsute at the base, pubescent above, 1 lin. long; lobes erect, connivent, as long as the tube, acute, 3-nerved. Corolla twice as long as the calyx, pubescent outside; lobes very small. Style as long as the corolla.

Nile Land. British Somaliland: Ahl Mountains, at Damalle, 3200 ft., *Hildebrandt*, 848!

6. **TOURNEFORTIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 843.

Calyx deeply 5-lobed. Corolla-tube cylindrical; lobes 5, oblong, patent. Stamens 5, included in the corolla-tube; filaments very short; anthers ovate-oblong. Disk cupular or inconspicuous. Ovary globose, 4-celled; style subulate, with a stigmatose ring below the 2-lobed tips; ovules solitary, pendulous. Drupe small, globose, not fleshy in the only Tropical African species, with 4 one-seeded pyrenes which cohere in pairs. Seed straight or more or less curved, usually albuminous.—Trees or shrubs, erect or scandent. Leaves alternate, entire. Inflorescence a very compound cyme, with scorpioid branches. Flowers small.

Species about 100, spread through the warmer regions of both hemispheres, concentrated in Tropical America.

1. **T. argentea,** *Linn. f. Suppl.* 133. An erect shrub; branchlets short, clothed like the leaves and calyx with pale brown velvety

tomentum. Leaves crowded at the end of the branches, oblanceolate, obtuse, entire, 6–9 in. long, narrowed gradually to the base. Inflorescence a very compound cyme, with a long peduncle and many-flowered spicate branchlets. Calyx campanulate, 1½ lin. long. Corolla white, fragrant; tube as long as the calyx; lobes short, broad. Style very short below the stigmatose ring, forked above it. Drupe globose, black when dried, about 2 lin. in diam. Seeds not albuminous.—DC. Prodr. ix. 514; Klotzsch in Peters' Reise Mossamb. Bot. 250; Baker, Fl. Maurit. 201; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 145.

Lower Guinea. Amboland; Olukonda, *Schinz*, 757!

Mozamb. Dist. Portuguese East Africa: Mozambique coast, *Peters*.

Also in the Mascarene Islands, Tropical Asia, and Polynesia.

7. HELIOTROPIUM, Linn.; Benth. et Hook. f. Gen. Pl. ii. 843.

Calyx small, campanulate, usually deeply 5-lobed; lobes oblong or lanceolate. Corolla-tube cylindrical; lobes 5, usually short and obtuse, patent, imbricate or induplicate. Stamens 5, inserted about the middle of the corolla-tube; filaments very short; anthers ovate-oblong, or lanceolate. Ovary 4-celled; style terminal, simple, usually short, with a stigmatic ring below the apex; ovules pendulous. Fruit usually breaking up into 4 nuts, which are distinct or cohere in pairs; seeds straight or curved; albumen usually present; cotyledons plano-convex; radicle short.—Herbs or undershrubs, usually hairy or scabrid. Leaves alternate, rarely subopposite. Flowers usually in simple or compound scorpioid spikes.

Species 100 or more, spread through the warm and temperate regions of both hemispheres.

H. Deserti, Vatke in Oest. Bot. Zeitschr. 1875, 166, and Linnæa, xliii. 321, is *Verbena supina*, L.

Corolla-lobes distinctly caudate . . . . . 1. *H. zeylanicum.*
Corolla-lobes not caudate.
* Annuals.
Leaves obtuse at the base.
Calyx sparingly pilose . . . . . 2. *H. indicum.*
Calyx strigose . . . . . 3. *H. simile.*
Calyx densely hirsute . . . . . 4. *H. pallens.*
Leaves tapering to the base.
Leaves obovate.
Corolla-tube scarcely longer than the calyx 5. *H. phyllosepalum.*
Corolla-tube distinctly longer than the calyx 6. *H. ovalifolium.*
Leaves elliptic . . . . . 7. *H. Baclei.*
Leaves oblong.
Nutlets pubescent . . . . . 8. *H. europæum.*
Nutlets glabrous . . . . . 9. *H. pterocarpum.*
Leaves linear-lanceolate . . . . 10. *H. curassavicum.*
** Perennials.
Stigma subcapitate . . . . . 11. *H. albohispidum.*
Stigma mushroom-shaped . . . . . 12. *H. arbainense.*
Stigma with two long arms . . . . 13. *H. ophioglossum.*

Stigma with a conical crest.
† Spikes dense, ebracteate.
Nerves of leaves impressed above . . 14. *H. supinum.*
Nerves of leaves not impressed above.
Leaves hispid with bulbous-based bristles.
Corolla less than twice as long as the calyx . . . . . 15. *H. undulatum.*
Corolla 4 times as long as the calyx . 16. *H. hirsutissimum.*
Leaves hirsute or pubescent.
Corolla-lobes flat with intermediate folds . . . . . 17. *H. erosum.*
Corolla-lobes flat without intermediate folds . . . . . 18. *H. oliverianum.*
Nutlets pubescent . . . . 19. *H. tubulosum.*
Nutlets scabrid . . . . 20. *H. cinerascens.*
†† Spikes many-flowered, bracteate . . 21. *H. Vatkei.*
††† Spikes few-flowered, bracteate.
Leaves linear, hairs simple . . . 22. *H. rariflorum.*
Leaves lanceolate, with white bristles . 23. *H. lignosum.*
Leaves oblanceolate, hairs bulbous-based 24. *H. arenarium.*
Leaves more or less ovate, hairs simple . 25. *H. marifolium.*
†††† Spikes many-flowered, at length lax, ebracteate.
Leaves linear or linear-lanceolate, sessile or subsessile . . . . . 26. *H. strigosum.*
Leaves broader, distinctly petioled.
Corolla 4 times as long as the calyx 27. *H. abyssinicum.*
Corolla 2–3 times as long as the calyx 28. *H. longiflorum.*
Corolla not more than twice as long as the calyx.
Leaves slightly undulate . . 29. *H. Steudneri.*
Leaves flat.
Branches pubescent . · 30. *H. dissimile.*
Branches scabrid.
Stigma bifid . . . 31. *H. somalense.*
Stigma 4-toothed . . 32. *H. Eduardi.*

1. **H. zeylanicum,** *Lam. Encycl.* iii. 94. Perennial. Stems slender, erect, woody, much branched, finely pubescent and with long white bristles. Leaves linear or linear-lanceolate, 1–3 in. long, narrowed to the base, with bulbous-based hairs especially on the upper side, pubescent beneath, sessile or shortly petioled. Spikes lax, ebracteate, finally 6–9 in. long. Calyx 1 lin. long, hairy outside; lobes ovate. Corolla-tube 2 lin. long, hairy outside; lobes 1 lin. long, caudate-acuminate. Anthers inserted in the upper part of the corolla-tube, lanceolate; connective produced above, bifid. Style 1 lin. long, glabrous; stigma conical, slightly shorter than the style. Fruit depressed globose, not longer than the calyx; nutlets 4, often cohering in pairs, rugose.—Wight, Ic. t. 892; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 148; Hiern in Cat. Afr. Pl. Welw. i. 720; Gregory, Great Rift Valley, 395. *H. curassavicum*, var. *zeylanicum*, Burm. Fl. Ind. 41, t. 16. fig. 2? *H. subulatum*, Hochst. ex Vatke in Linnæa, xliii. 316; Martelli, Florul. Bogos. 59. *H. gracile*, R. Br. in Salt, Abyss. Append. lxiii. *H. micranthum*, Welw. Apont. Phyto-Geogr. 591.

Tournefortia zeylanica, Wight, Ill. t. 170, fig. B. *T. subulata*, Hochst. ex DC. Prodr. ix. 528; A. Rich. Tent. Fl. Abyss. ii. 83. *T. stenoraca*, Klotzsch in Peters, Reise Mossamb. Bot. 250.

Upper Guinea. Senegal, *Roger!* Northern Nigeria: Kuka, on Lake Chad, *Vogel*, 36!

Nile Land. Nubia: coast-land. *Bent!* Soturba Mountains, *Schweinfurth*, 2068! Hormareb, *Schweinfurth*, 680! Sennar, *Kotschy*, 307! Fazokl, *Kotschy*, 543! Kordofan, *Kotschy*, 163! *Pfund*, 251! 468! Eritrea: Barasio Valley, *Schweinfurth & Riva*, 703! Abyssinia, *Roth*, 123 (437)! *Schimper*, 487! 1285! British Somaliland, *Mrs. Lort Phillips!* British East Africa: Mombasa, *Scott-Elliot*, 6110! Kili Makei, *Kassner*, 615! between Mombasa and Mount Kenia, *Gregory!*

Lower Guinea. Angola: Loanda, in damp places, *Welwitsch*, 5424! 5425! 5426! Ambriz, *Welwitsch*, 5452! Icolo e Bengo; near Foto, *Welwitsch*, 5434! Mossamedes; by the River Bero, *Welwitsch*, 5292! near Humbe, *Baum*, 102!

Mozamb. Dist. German East Africa: Tanga, *Holst*, 2089! Pangani, *Volkens*, 469! Amboni, *Kassner*, 6! near Lake Tanganyika, *Scott-Elliot*, 8227! north of Lake Nyasa, *Thomson!* Portuguese East Africa: Lower Zambesi; near Lupata, *Kirk!* Sena, *Kirk!* British Central Africa: Nyasaland; Karonga, *Scott!* Kondowe to Karonga, *Whyte!* Fort Hill, *Whyte!* and without precise locality, *Buchanan*, 1004!

Also in the drier parts of India, the Orient, and the Mediterranean region.

This is the widely spread plant which has long been known as *H. zeylanicum*, Lam.; some doubt has arisen as to the correctness of this name, as Burmann's figure, upon which Lamarck founded his species, does not show the caudate-acuminate corolla-lobes, nor has the plant been found in Ceylon (see Trimen, Handb. Fl. Ceyl. iii. 199). It is undesirable, however, to abandon such a well-known name, especially as the evidence in favour of such a change is by no means definite.

2. **H. indicum,** *Linn. Sp. Pl. ed.* i., 130. A stout annual herb. Stems erect, 1–3 ft. high, pilose. Leaves opposite and alternate, ovate, obtuse or subcordate (more rarely shortly cuneate) at the base, irregularly sinuate at the margin, pilose on both sides, varying much in size but usually about 4 by 3 in.; petiole 2 in. long, narrowly winged. Spikes usually simple, about 5 in. long, many-flowered; peduncles short. Calyx 5-partite, 1 lin. long, sparsely pilose; lobes lanceolate, acute. Corolla lilac or white; tube $2\frac{1}{2}$ lin. long; lobes orbicular. Anthers inserted just below the middle of the corolla-tube. Style short, glabrous; stigma subglobose, with a slender basal frill. Fruit divaricately 4-lobed.—Bot. Mag. t. 1837; Vatke in Linnæa, xliii. 318; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 152; Hiern in Cat. Afr. Pl. Welw. i. 719; var. *Petersii*, Schweinf. Beitr. Fl. Aethiop. 115. *H. anisophyllum*, Beauv. Fl. Owar. ii. 62, t. 96. *Heliophytum indicum*, DC. Prodr. ix. 556. *Tiaridium indicum*, Lehm. Pl. Asper. 14; Wight, Ill. ii. 211, t. 171.

Upper Guinea. Senegal: Richard Tol, *Dollinger*, 63! Senegambia (*Heudelot?*) 721! Sierra Leone: Scarcies Valley, *Scott-Elliot*, 4719! Gold Coast: Cape Coast Castle: *Vogel*, 48! Ashanti, *Cummins*, 22! Togo: near Lome, *Warnecke*, 277! Lagos, *Dawodu*, 3! *Irving!* Northern Nigeria: Nupe, *Barter*, 1269! Southern Nigeria, *Holland*, 209! Cameroons, *Braun*, 56! *Zenker*, 1520A!

Nile Land. Sennar? *Kotschy*, 222! British East Africa: near Mombasa, *Wakefield! Whyte!*

Lower Guinea. St. Thomas Island, *Mann*, 1093! Angola: *Welwitsch*, 5427! 5459! *Johnston! Monteiro!*

South Central. Congo Free State: Bangala, *Hens*, C 180! Kibali River, *Schweinfurth*, 544!

Mozamb. Dist. German East Africa: Umba Valley, *Smith! Küssner*, 75! Rufiji River, *Goetze*, 64! Mgeta River, *Speke & Grant!* Portuguese East Africa: Lower Zambesi, *Peters*. British Central Africa: Nyasaland; Matope, *Scott-Elliot*, 8489!

3. **H. simile,** *Vatke in Linnæa*, xliii. 317. Probably annual. Stems herbaceous, clothed with spreading hairs. Leaves ovate, obtuse, sometimes 2 in. long, 1 in. wide, broadly rounded or subcordate at the base, repand, scabrid on both sides; lower petioles 7 lin. long. Spikes dense, many-flowered, ebracteate. Calyx strigose, 2 lin. long; lobes linear. Corolla-tube hairy, 2 lin. long; lobes obtuse. Style glabrous, longer than the conical stigma. Nuts 4, rugose, glabrous.—Gürke in Engl. Pfl. Ost-Afr. C. 337.

Nile Land. British East Africa: Ukamba; *Hildebrandt*, 2849.

4. **H. pallens,** *Del. Cent. Pl. Afr. Caill.* 69, *t.* 3, *fig.* 4. An erect much-branched annual herb. Stem softly tomentose. Leaves ovate, acute, rounded or shortly cuneate at the base, up to 2 by 1½ in., densely pubescent on both surfaces, hairs on the underside of the nerves longer than elsewhere; petiole up to 9 lin. long, pilose. Cymes spicate, sometimes forked, arranged in a terminal, sometimes leafy panicle; flowers crowded. Calyx 1½ lin. long, densely hirsute, divided almost to the base; lobes 5, linear. Corolla white (*Delile*), 3 lin. long, 2 lin. in diam.; tube contracted just above the base, pubescent outside; lobes rounded, obtuse, sometimes slightly undulated. Stamens inserted about half-way up the corolla-tube; anthers subsessile, lanceolate, 1 lin. long. Ovary ovoid or conical; style about ½ lin. long, retrorsely pilose; stigma conical from a flat base, nearly as long as the style, shortly bifid. Nutlets finely reticulate.—DC. Prodr. ix. 534; Schweinf. Beitr. Fl. Aethiop. 116; Vatke in Oest. Bot. Zeitschr. 1875, 166; Engl. Hochgebirgsfl. Trop. Afr. 351. *H. ægyptiacum*, Lehm. in Ind. Sem. Hort. Hamb. 1821, 8, and Pugill. i. 20. *H. europæum*, Speke, Nile, Append. 641; Oliv. in Trans. Linn. Soc. xxix. 114, not of Linn.

Nile Land. Nubia: Dongola, *Cailliaud*, coast region, *Bent!* Egyptian Soudan: New Dongola, *Bromfield*, 93! Sennar, *Kotschy*, 267! Bweola, *Petherick!* between Berber and Khartoum, *Schweinfurth*, 553! Khartoum, *Petherick! Broun! Kotschy*, 325! *Schweinfurth*, 844! El-Korehr, *Ehrenberg* ex *Schweinfurth*. Seru in Fesoghlu, *Cienkowsky* ex *Schweinfurth*! Kordofan, *Pfund*, 278! 453! *Kotschy*, 231! British Somaliland: Golis Range, *Miss Cole! Mrs. Lort Phillips!* Ahl Mountains near Yafir, 6500 ft., *Hildebrandt*, 845, ex *Vatke*.

This species bears a striking resemblance to *H. villosum*, Willd., from which it is distinguished by the elongate, hairy style, and long conical stigma.

5. **H. phyllosepalum,** *Baker in Kew Bulletin*, 1894, 30. Annual. Stems ascending, shortly softly hairy. Leaves obovate, long-petioled,

thin, not crisped, very obtuse, narrowed gradually from the middle to the base, the largest 1½–2 in. long; petiole very hairy; spikes moderately dense, ebracteate, finally 2 in. long. Calyx very hairy; tube very short; segments unequal, two 1¼ lin. long, ovate, the rest much shorter, linear. Corolla-tube not longer than the calyx; lobes small, orbicular. Stamens inserted near the base of the corolla-tube. Style very short: stigma with a produced conical crest. Nuts 4; shorter than the calyx.

Mozamb. Dist. Portuguese East Africa: banks of the River Shire at Mosambala, *Scott !*

Habit of *H. europæum* and its allies.

6. **H. ovalifolium,** *Forsk. Fl. Ægypt.-Arab.* 38. Herbaceous from a woody base. Stem much-branched, diffuse, densely clothed with soft whitish spreading hairs. Leaves obovate or elliptic, obtuse, densely hairy on both surfaces, ⅓–1¼ in. long, 3–8 lin. broad; petiole 2–9 lin. long. Cymes spicate, numerous, rather dense, ebracteate, finally 2–3 in. long. Calyx ¾ lin. long, white hairy outside; one lobe lanceolate, much broader than the linear others. Corolla 1 lin. long; lobes ⅕ as long as the tube, orbicular. Stamens inserted just above the corolla-base; anthers small, lanceolate. Ovary globose; stigma subsessile, conical. Fruit depressed globose, scarcely 1 lin. in diam.; nutlets 4, hispid.—C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 150; Hiern in Cat. Afr. Pl. Welw. i. 718; Gürke in Warb. Kunene-Samb. Exped. 348; C. H. Wright in Dyer, Fl. Cap. iv. ii. 8. *H. coromandelianum*, Retz. Obs. ii. 9; Wight, Ic. t. 1388; Klotzsch in Peters, Reise Mossamb. Bot. 253; Lehm. Pl. Asper. 46; var. *obovatum*, DC. Prodr. ix. 541. *H. brocchianum*, Vis. Pl. Ægypt. & Nub. 8, t. 2, fig. 1. *H. apiculatum*, E. Meyer in Drège, Zwei Pflanzengeogr. Documente, 93. *H. Kunzii*, Lehm. Ic. & Descr. Stirp. 19, t. 29. *H. cinereum*, R. Br. in Salt, Abyss. Append. 63. *H. niloticum*, ADC. in DC. Prodr. ix. 541.

Upper Guinea. Senegal: *Sieber*, 12 ! *Dollinger*, 56 ! Northern Nigeria: Nupe, *Barter !*

Nile Land. By the River Nile, *Bromfield ! Schweinfurth*, 913 ! Sennar, *Kotschy*, 146 ! 281 ! 333 ! 334 ! 335 ! between Berber and Khartoum, *Schweinfurth*, 477 ! 507 ! ser. iii. 57 ! near Khartoum, *Schweinfurth*, 892 ! *Broun !* Kordofan, *Kotschy*, 7* ! *Pfund*, 497 ! Darfur, *Purdy*, 65 ! Galabat, *Schweinfurth*, 2098 ! Abyssinia: Tacazze Valley, *Schimper*, 1580 ! Uganda: Fort Johnstone, *Scott-Elliot*, 8423 ! British East Africa: Athi Plains, *Scott-Elliot*, 6557 ! Witu, *Thomas*, 76 !

Lower Guinea. Angola: Icolo e Bengo, *Welwitsch*, 5435 ! Loanda, *Welwitsch*, 5439 ! 5440 ! 5441 ! 5442 ! Cazengo, *Welwitsch*, 5447 ! Mossamedes, *Welwitsch*, 5288 ! 5289 ! 5290 ! Barra do Bengo; near Santo Antonio, *Welwitsch*, 5443 ! by the River Kubango, *Baum*, 436 ! German South-west Africa: Amboland; Olukonda, *Schinz*, 827 ! 829 !

Mozamb. Dist. German East Africa, *Busse*, 885 ! Portuguese East Africa: Lower Zambesi, *Peters*. British Central Africa: Nyasaland; Kondowe to Karonga, *Whyte !* Tropical Transvaal; Shilouvane (Sebolane ?) *Junod*, 757 !

7. **H. Baclei,** *DC. Prodr.* ix. 546. Annual. Stems much-branched, diffuse, clothed with adpressed bristly hairs. Leaves elliptic, narrowed

to both ends, entire, flat, clothed with adpressed bristly hairs. Spikes lax, 5–8-flowered; bracts foliaceous, larger than the calyx. Corolla longer than the calyx, thinly strigillose; throat naked. Style very short; stigma with a dilated base and acuminate apex. Nuts 4, slightly hairy, acuminate.

West Tropical Africa. Quoja, *Bacle.*

8. **H. europæum**, *Linn. Sp. Pl. ed.* i. 130. Annual. Stems erect, much branched, clothed with short whitish hairs. Leaves thin, flat, oblong or ovate, obtuse, petioled, densely shortly hairy on both sides. Spikes ebracteate, at first short, dense, finally laxer and about 2 in. long. Calyx 1 lin. long, very hairy; tube very short; lobes lanceolate. Corolla-tube hairy, not longer than the calyx; lobes small, orbicular. Style short, glabrous; stigma with a produced conical apex. Nuts rugose, pubescent.—Plenck, Ic. t. 74 (stigma wrongly drawn); DC. Prodr. ix. 534; Schweinf. Beitr. Fl. Aethiop. 116.

Nile Land. Abyssinia: near Jaja, *Schimper*, ex *Schweinfurth.*

Also in North Africa, South Europe, and the Orient.

9. **H. pterocarpum,** *Hochst. & Steud. ex DC. Prodr.* ix. 552. Annual. Stems short, spreading, slender, densely clothed with whitish bristly hairs. Leaves small, oblong, sessile or shortly petioled, thick, crisped on the margin, densely hispid on both sides. Spikes short, ebracteate, very dense, much curved. Calyx densely hispid, 2 lin. long; tube short; lobes oblong, free nearly to the base, or more or less united, 3 lin. long. Corolla-tube narrowly campanulate; lobes small, orbicular. Stamens inserted just below the middle of the corolla-tube; anthers oblong. Stigma conical, as long as the glabrous style, together 1 lin. long. Nuts glabrous, cohering in pairs, margined with a broad horny wing, with a rounded sinus at the apex.—Vatke in Oest. Bot. Zeitschr. 1875, 168. *Heliophytum pterocarpum*, DC. Prodr. ix. 552.

Nile Land. Eritrea: near Saati, *Schweinfurth & Riva*, 365! near Massowa, *Hildebrandt*, 721; and British Somaliland near Lasgori, *Hildebrandt*, 846 (ex *Vatke*). Hamfila Bay, *Terracciano.*

Also in Arabia and Socotra.

Resembles *H. undulatum*, Vahl, in an early stage, but the fruit is totally different.

10. **H. curassavicum,** *Linn. Sp. Pl. ed.* 1, 130. Annual. Stems slender, glabrous, prostrate. Leaves linear-lanceolate, obtuse, glabrous, rather fleshy, narrowed to a short petiole, not at all crisped, the lower 1–1½ in. long. Spikes usually in pairs, moderately dense, ebracteate, finally 2–3 in. long. Calyx glabrous, 1 lin. long; tube none: segments ovate. Corolla-tube not longer than the calyx; lobes oblong. Style very short; stigma large, umbrella-shaped, apex not produced. Fruit globose, not longer than the calyx; nuts 4, glabrous.—DC. Prodr. ix. 538; Bot. Mag. t. 2669; Hiern in Cat. Afr. Pl. Welw. i. 718; C. H. Wright in Dyer, Fl. Cap. iv. ii. 7.

Lower Guinea. Angola: Mossamedes; near Aguadas, *Welwitsch*, 5293 ! 5435B; by the River Croque, *Johnston !*

Mozamb. Dist. Portuguese East Africa: Chiloane, *Scott !*

An American weed, now established in many places in the Old World.

11. **H. albohispidum,** *Baker in Kew Bulletin*, 1895, 220. A much-branched perennial herb. Stem woody at the base. Branches densely clothed with adpressed strong white hairs. Leaves sessile, linear, with revolute edges, the lower 6–9 lin. long, clothed on both surfaces with adpressed white hairs. Racemes long; bracts linear-subulate, persistent; pedicels short, erect. Calyx $1\frac{1}{2}$ lin. long; segments linear, hispid. Corolla 2 lin. long; tube clothed with yellow hairs inside in the upper half; limb $1\frac{1}{2}$ lin. in diam.; lobes orbicular, spreading, undulate. Anthers subsessile in the corolla-throat, linear. Ovary oblong, $\frac{1}{2}$ lin. long; style subulate, as long as the ovary; stigma subcapitate.

Nile Land. British Somaliland: Hammar, *Miss Edith Cole !*

This species resembles *H. rariflorum*, Stocks, but has a longer corolla, with different shaped lobes.

12. **H. arbainense,** *Fresen. in Mus. Senckenb.* i. (1834) 168. Perennial. Stems short, ascending, much-branched, densely clothed with short soft whitish hairs. Leaves petioled, ovate or oblong, small, densely hairy on both sides, rounded or narrowed to the base. Spikes dense, ebracteate, finally 2–3 in. long. Calyx very glandular, hairy, 2 lin. long; tube short; lobes ovate. Corolla-tube hairy, twice as long as the calyx; lobes small, ovate. Stamens inserted just below the middle of the corolla-tube; anthers lanceolate, acute. Stigma mush-room-shaped, glabrous, nearly sessile. Nuts 4, shorter than the calyx, rugose, glabrous.—DC. Prodr. ix. 537; Boiss. Fl. Orient. iv. 146.

Nile Land. Coast of Nubia, ex *Boissier.*

Also in Egypt, Arabia, and Afghanistan.

13. **H. ophioglossum,** *Stocks ex Aitch. Cat. Punj. Pl.* 94. Suffruticose, pubescent and hispid with patent, sometimes bulbous-based, hairs, except on the corolla. Lower leaves elliptic, petioled, upper subsessile, lanceolate, sometimes sinuous, Cymes spicate, 2–3 together, up to 8 in. long, ebracteate; flowers sometimes distant. Calyx 5-partite nearly to the base, 2 lin. long; segments linear. Corolla white; tube about as long as the calyx, cylindric, slightly pubescent outside; lobes 5 with 5 intermediate folds, undulate, about $\frac{1}{2}$ lin. long. Anthers inserted about the middle of the corolla-tube, oblong, about 1 lin. long. Ovary shortly conical; style very short; stigma discoid, terminated by a subulate crest about 2 lin. long, bifid about $\frac{1}{3}$-way down. —Boiss. Fl. Orient. iv. 145; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 149. *H. ditrichum*, Stocks ex Aitch. l.c. *H. stylosum*, Franch. Sert. Somal. 45, t. 4, not of Philippi.

Nile Land. Somaliland: Merâya, *Révoil* ex *Franchet.*

Also in Scinde, Beloochistan, and Southern Arabia.

14. **H. supinum,** *Linn. Sp. Pl. ed.* i. 130. Annual, hirsute, much branched. Stem decumbent at the base. Leaves opposite or alternate, oval or oblong, obtuse, cuneate at the base, more or less crenate, densely hairy on both surfaces, up to 18 by 6 lin., shortly petioled. Spikes simple or once forked, dense, ebracteate. Calyx $1\frac{1}{2}$ lin. long, hairy outside; lobes $\frac{1}{5}$ as long as the tube, obtuse. Corolla-tube as long as the calyx; lobes exserted, very short, rounded. Stamens inserted just below the middle of the corolla-tube. Ovary glabrous; style as long as the ovary. Mature nutlets 1–2 to each flower, 2 lin. long, enclosed in the persistent calyx, plano-convex, dark brown, with a lighter brown border, obscurely tubercled.—Lehm. Pl. Asper. 48, excl. syn. Forsk.; Sibth. Fl. Græca, t. 157; DC. Prodr. ix. 533; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 149; Engl. Hochgebirgsfl. Trop. Afr. 351; Hiern in Cat. Afr. Pl. Welw. i. 717; Gürke in Warb. Kunene-Samb. Exped. 347; C. H. Wright in Dyer, Fl. Cap. iv. ii. 8. *H. ambiguum*, DC. Prodr. ix. 533. *H. coromandelianum*, Raddi ex DC. l.c. *Lithospermum heliotropioides*, Forsk. Fl. Ægypt.-Arab. 39. *Piptoclaina supina*, G. Don, Gen. Syst. iv. 364.

Nile Land. Soudan: Khartoum, *Schweinfurth*, 874! *Broun!* Sennar, *Kotschy*, 336! Kordofan; Hogeli, *Kotschy*, 210! Abyssinia: Urahut district, *Schimper*, 1782! and without precise locality, *Schimper*, 1339! Galla: Lake Zuai, *Wellby!* British East Africa: Lake Rudolph, *Wellby!*

Lower Guinea. Angola: Mossamedes: near San Joao de Caroca, *Welwitsch*, 5287! by the River Bero, *Welwitsch*, 5286; between Ediva and Humbe, *Baum*, 70! Huilla, *Johnston!*

Also in North and South Africa, South Europe, the Canary Islands, and India.

15. **H. undulatum,** *Vahl, Symb.* i. 13. Perennial, much-branched. Stem slender, suberect, densely clothed with white bulbous-based bristles. Leaves scabrid on both surfaces, undulate, the upper lanceolate, sessile, the lower oblong, tapering into a short petiole, up to $2\frac{1}{2}$ in. long and 7 lin. broad. Spikes many, short, dense, ebracteate. Calyx 1 lin. long, hairy outside; lobes 5, oblong, truncate, as long as the tube. Corolla $1\frac{3}{4}$ lin. long; tube slightly inflated near the middle; lobes short, rounded, much undulated. Stamens inserted about halfway up the corolla-tube; anthers lanceolate, acute. Style short, thick, glabrous; stigma conical. Fruit globose, almost 2-winged, pilose at first, finally glabrous; nutlets 4, rugose.—DC. Prodr. ix. 536; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 150; Schmidt, Beitr. Fl. Cap. Verd. Ins. 225; Hiern in Cat. Afr. Pl. Welw. i. 718. *H. crispum*, Desf. Fl. Atlant. i. 151, t. 41. *H. persicum*, Lam. Encycl. iii. 94; DC. l.c. 537; Boiss. Fl. Orient. iv. 147. *H. ramosissimum*, Sieber ex DC. l.c. *H. eriocarpum*, Delile ex Lehm. Asper. 55. *H. paradoxum*, Vatke in Oest. Bot. Zeitschr. 1875, 167. *H. nubicum*, Bunge in Bull. Soc. Nat. Mosc. xlii. i. 330 (1869). *H. cressoides*, Franch. Sert. Somal. 46. *Lithospermum hispidum*, Forsk. Fl. Ægypt.-Arab. 38.

Upper Guinea. Senegambia: Mbidjem, *Thierry*, 51! Sor Island, *Brunner*, 27! Senegal, *Dollinger*, 1! *Roger*, 40! *Sieber*, 11! Northern Nigeria: Bornu: Kuka, on Lake Chad, *Vogel*, 12! and without precise locality, *Elliot*, 122!

Nile Land. Nubia: coast region, *Bent!* between Suakin and Berber, *Schweinfurth*, 280! Soudan: near Khartoum, *Petherick!* Sennar, *Kotschy*, 279!

476! Kordofan, *Kotschy*, 11! 255! *Pfund*, 68! 105! 448! White Nile, *Schweinfurth*, 907.

Extends from the Cape Verde Isles through North Africa, Arabia, Socotra and Tropical Asia.

16. **H. hirsutissimum,** *Vatke in Oest. Bot. Zeitschr.* 1875, 167. Perennial. Stems much-branched, densely clothed with spreading bristly hairs. Leaves petioled, ovate-oblong, 6–18 lin. long, broadly rounded at the base, repand at the margin, densely hairy, with white tubercles on both sides. Spikes solitary or in pairs. Calyx-lobes linear. Corolla-tube hairy, 4 times the length of the calyx. Stigma short, conic, with an entire crest. Nuts unknown.—Linnæa, xliii. 320.

Nile Land. British Somaliland: Ahl Mountains, near Damalle, *Hildebrandt*, 846A.

17. **H. erosum,** *Lehm. in Neue Schr. Naturf. Ges. Halle*, iii. ii. (1817) 15.—Perennial. Stems slender, ascending, densely clothed with short whitish bristly hairs. Leaves oblong, obtuse, densely hairy on both sides, narrowed to the base, the upper sessile, the lower petioled. Spikes like those of *H. undulatum*, very dense, short, ebracteate. Calyx densely hairy, 1–1½ lin. long; tube short; lobes linear. Corolla white; tube very hairy, longer than the calyx; lobes rounded, with intermediate folds. Anthers inserted below the middle of the corolla-tube, oblong-lanceolate. Style short, glabrous; stigma conical, ½ lin. long. Fruit globose, hairy, as long as the calyx; nuts cohering in pairs, not winged.—Pl. Asper. i. 54; Hiern in Cat. Afr. Pl. Welw. i. 719. *Heliophytum erosum*, DC. Prodr. ix. 552.

Upper Guinea. Senegambia, *Sieber*, 10, ex *DC.*

Also in the Canaries and Cape Verde Islands.

18. **H. oliverianum,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxx. 268. A densely hirsute perennial herb. Leaves sessile or shortly petioled, ovate, lanceolate or subelliptic, obtuse, tapering towards the base, ½–1½ in. long, 2–6 lin. wide, densely hairy on both sides, margins more or less undulate. Cymes 1–3½ in. long, dense-flowered. Calyx clothed with patent dull yellowish-green hairs, 5-partite; segments linear, 3 lin. long. Corolla-tube 4½ lin. long, pubescent on both sides; lobes very small, rounded, yellow. Anthers glabrous, inserted near the base of the corolla, not appendaged. Style thick; stigma depressed-conic, minutely 2-lobed. Nutlets obliquely ovoid, pubescent, 1 lin. long. —*H. anchusanthum*, Hiern in Cat. Afr. Pl. Welw. i. 718.

Lower Guinea. Angola: Mossamedes; heights of Porto de Pinda, *Welwitsch*, 5295! near Praia da Amelia, *Welwitsch*, 5296! between Cabo Negro and Mossamedes, *Welwitsch*, 5297. German South-west Africa: Zwartbank Mountains, near Walfish Bay, *Stapff*; Namib Flats, *Belck*, 55; Hereroland, *Schinz!*

19. **H. tubulosum,** *E. Meyer in Drège, Zwei Pflanzengeogr. Documente*, 93. Whole plant densely hirsute, 5 in. or more high. Stem terete, up to 3 lin. in diam. Leaves lanceolate, acuminate at both ends, up to 1¼ in. by 5 lin.; petiole up to 6 lin. long. Panicle terminal,

cymose; peduncles up to 1 in. long; cymes densely many-flowered, up to 3 in. long. Calyx 3 lin. long, divided nearly halfway down into 5 linear obtuse lobes. Corolla infundibuliform; tube slightly longer than the calyx; lobes broad, undulate. Stamens inserted about halfway up the corolla-tube; anthers oblong, 1 lin. long, obtuse at both ends. Ovary minute; style $1\frac{1}{4}$ lin. long, with numerous reflexed hairs; stigma conical. Nutlets plano-convex, pubescent on the back.—DC. Prodr. ix. 537; C. H. Wright in Dyer, Fl. Cap. iv. ii. 9.

Lower Guinea. Angola: near Mossamedes, very common in dry sandy places around fazenda "Boa Vista," *Gossweiler*, 79! German South-west Africa: Hereroland, *Rautanen*, 248! Damaraland, in grass fields, *Lindner!*

Also in South Africa.

20. **H. cinerascens,** *Steud. ex DC. Prodr.* ix. 534. Perennial. Stems woody, erect, clothed with whitish tomentum. Leaves petioled, ovate or oblong, acute, narrowed to the bases, 1–2 in. long, not at all crisped, densely pubescent on both sides. Spikes dense, ebracteate, finally 2–3 in. long. Calyx densely pubescent, $1\frac{1}{2}$ lin. long; tube as long as the oblong segments. Corolla-tube hairy, half as long again as the calyx, subcylindric; lobes small, orbicular, slightly undulate. Style short, thick, retrorsely hairy. Stigma with a conical crest. Nuts 4, tubercled, scabrid.—A. Rich. Tent. Fl. Abyss. ii. 85; Engl. Hochgebirgsfl. Trop. Afr. 352.

Nile Land. Eritrea: Keren, 4500 ft., *Beccari*, 146! Arrot Valley, *Schweinfurth & Riva*, 680! around Acrur, *Schweinfurth & Riva*, 1127! Abyssinia, *Schimper*, 1161! *Petit*, 429! *Quartin-Dillon & Petit*, 189! *Plowden!*

Also in Arabia.

21. **H. Vatkei,** *Baker.* Perennial. Stems much-branched. woody, clothed with adpressed white bristly hairs: branches virgate. Leaves sessile, linear, obtuse, flat, strigose, 6 lin. long. Spikes long, slender, bracteate, bearing above 20 flowers; lower pedicels 1 lin. long. Calyx $1\frac{1}{2}$ lin. long, strigose; lobes linear. Corolla 2 lin. long; tube slightly longer than the calyx, glabrous outside, minutely hairy in the throat; lobes obtuse. Nuts tubercled, 1 lin. long.—*H. thymoides*, Vatke in Oest. Bot. Zeitsch. 1875, 166, not of Jaub. & Spach. *H. calcareum*, Vatke in Linnæa, xliii. 318; Engl. Hochgebirgsfl. Trop. Afr. 352, not of Stocks.

Nile Land. British Somaliland: Ahl Mountains at Yafir, 6000 ft., *Hildebrandt*, 830A or 890A, Serut Mountains, near Maid, *Hildebrandt*, 1416.

22. **H. rariflorum,** *Stocks in Hook. Journ. Bot.* 1852, 174. Root very thick and woody. Stems short, woody, much-branched, ascending, coated with white tomentum. Leaves small, sessile, linear with revolute edges, densely clothed with short white bristly hairs. Spikes lax, bracteate, 3–5-flowered. Calyx 1 lin. long, clothed with short white bristly hairs; tube short; segments ovate. Corolla-tube not longer than the calyx; lobes suborbicular. Stamens inserted above the middle of the corolla-tube; style elongated, glabrous; stigma shortly conical,

pilose. Nuts 4, hispid.—Walp. Ann. v. 543; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 152. *Lithospermum leucophlœum*, Schweinf. ex C. B. Clarke, l.c.

Nile Land. Nubia: between Suakin and Berber, *Schweinfurth*, 696!

Also in Beluchistan.

23. **H. lignosum,** *Vatke in Oest. Bot. Zeitsch.* 1875, 167. Fruticose. Stems short, woody, ascending, densely clothed with short adpressed whitish bristly hairs. Leaves small, sessile, lanceolate, with revolute crisped edges, densely and shortly bristly on both sides. Spikes short, dense, 3–6-flowered. Calyx 1½ in. long, very hispid; tube short; segments oblong. Corolla-tube slightly longer than the calyx, subcylindric; segments small, obtuse. Stamens inserted just below the middle of the corolla-tube. Style short; stigma conical; apex bilobed. Nuts 4, hispid.—*Lithospermum lignosum*, Schweinf. ex Vatke, l.c.

Nile Land. Nubia: coast north of Ras Ranar, *Schweinfurth*, 2111!

Also in Arabia.

24. **H. arenarium,** *Vatke in Linnæa*, xliii. 319. Suffruticose, much branched. Stems short, woody, ascending, densely pubescent. Leaves oblanceolate, rigid, about 1 in. long, 2 lin. broad, gradually narrowed to the subsessile base, revolute at the margins, densely clothed with adpressed white bulbous-based hairs. Spikes dense, very short; lower flowers bracteate. Calyx fleshy, densely strigose; lobes very unequal, the longest elliptic and 2 lin. long. Corolla-tube cylindric for 1 lin. below, funnel-shaped for 1 lin. above; lobes triangular, obtuse, ½ lin. long. Stamens inserted near the top of the corolla-tube. Ovary truncate; style slender, glabrous, 1 lin. long; stigma small, conical, bifid. Fruit small, scabrid.

Nile Land. Somaliland: coast hills near Baraua, *Hildebrandt*, 1314!

25. **H. marifolium,** *Retz. Obs.* ii. 8. A much-branched decumbent plant. Branches slender, slightly woody, hirsute. Leaves lanceolate to nearly ovate, up to 6 lin. long and 2 lin. broad, with adpressed hairs on both surfaces; petiole very short. Flowers in the axils of the upper leaves, white or yellow. Calyx 1½ lin. long, hairy outside; two segments ovate, the others linear. Corolla 2½ lin. long, central areas thickened and hairy outside, intermediate membranous and glabrous. Stamens inserted a short way above the base of the corolla-tube; connective much produced above the anther. Stigma subsessile, shortly conical, minutely 4-toothed. Fruit hispid in the upper part.—Wight, Ic. t. 1390; DC. Prodr. ix. 547; var. *Wallichii*, C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 152.

Upper Guinea. Senegal (*Leprieur*?), 874. Sierra Leone: dry sandy places, Makunde, in Limba district, *Scott-Elliot*, 5717!

Mozamb. Dist. British Central Africa: North Nyasaland; Elephant Marsh, *Scott!*

Also in Tropical Asia.

26. **H. strigosum,** *Willd. Sp. Pl.* i. 743. Perennial. Root more or less thick and woody. Stem slender, much-branched, clothed with adpressed white bristly hairs. Leaves linear or linear-lanceolate, sessile or very shortly stalked, up to 1¼ in. long, usually much smaller, with adpressed bristly hairs on both surfaces, revolute at the margins. Spikes very lax, finally 3 in. long; lower flowers often shortly pedicellate and bracteate. Calyx 1 lin. long, hairy outside; lobes from linear to lanceolate. Corolla-tube a little longer than the calyx, slightly swollen about the middle; lobes ⅓ lin. long, ovate, obtuse, crisped. Stamens inserted about the middle of the corolla-tube; anthers ovate, obtuse, crisped. Ovary globose; style ¼ lin. long, glabrous; stigma shortly conical, persisting on the young fruit. Fruit depressed, obtusely 4-lobed, ½ lin. long, hirsute above, separating into 4 nutlets, rounded not angled on the back.—DC. Prodr. ix. 546; Benth. Fl. Austr. iv. 397; Boiss. Fl. Orient. iv. 143; Hook. f. Fl. Brit. Ind. iv. 151; Hiern in Cat. Afr. Pl. Welw. i. 719; Gürke in Warb. Kunene-Samb. Exped. 347. *H. bicolor* and *H. cordofanum*, Hochst. & Steud. ex DC. l.c.; Schweinf. Beitr. Fl. Aethiop. 115. *H. longifolium*, *H. pygmæum* and *H. senense*, Klotzsch in Peters, Reise Mossamb. Bot. 251–253.

Upper Guinea. Senegal, *Roger*, 106! 108! Gold Coast: Cape Coast Castle, *Don!* Accra, *Vogel*, 6! 14! *Brown*, 355! Dagomba: Salaga, *Krause!* Togo: near Lome, *Warnecke*, 19! Dahomey, *Burton!* Northern Nigeria: Nupe, *Barter*, 307!

Nile Land. Nubia: Erkowit, *Schweinfurth*, 302! Gebel O-Fik, *Schweinfurth*, 2101! Hor Taminib, *Lord!* Coast-land, *Bent!* Kordofan, *Kotschy*, 96! 116! 208! *Pfund*, 136! Eritrea: Keren, *Beccari*, 163! near Saati, *Schweinfurth & Riva*, 377! 526! Abyssinia, *Quartin Dillon & Petit*, 208! *Schimper*, 2212! 2326! *Roth*, 440! 441! Jur: near Majob, *Schweinfurth*, 1551! British East Africa: Ndi, *Hildebrandt*, 2587! Makindu, *Kässner*, 536! north of Mombasa, *Whyte!*

Lower Guinea. Angola: *Welwitsch*, 5299! 5451! 5455! *Baum*, 8!

Mozamb. Dist. German East Africa: Dar es Salaam, *Hildebrandt*, 1220! Portuguese East Africa: Lower Zambesi; near Sena, *Kirk!* Tete, *Kirk!* British Central Africa: Nyasaland, *Buchanan*, 1298!

Also in Egypt, Arabia, Socotra, Tropical Asia, and Australia.

27. **H. abyssinicum,** *Vatke in Oest. Bot. Zeitsch.* 1875, 168. Shrubby. Branchlets sparsely strigose upwards. Leaves small, shortly petioled, ovate, obovate or oblong, obtuse, undulate and repand on the margin, clothed with dense yellowish bristly hairs. Spikes ebracteate. Calyx-lobes narrow. Corolla-tube hairy, four times the length of the calyx-lobes. Style slighty hairy; stigma shortly conical, with an entire or emarginate crest. Nuts smooth, slightly hairy.—Linnæa, xliii. 320; Engl. Hochgebirgsfl. Trop. Afr. 352.

Nile Land. Eritrea: Habab; *Hildebrandt*, 470B.

28. **H. longiflorum,** *Hochst. & Steud. ex A.DC. in DC. Prodr.* ix. 555. Perennial. Stems erect, slender, woody, clothed with short adpressed whitish hairs. Leaves lanceolate or oblong-lanceolate, not crisped, clothed on both surfaces with short adpressed bristly hairs, the lower sometimes 2–3 in. long; petiole 3–12 lin. long. Spikes lax,

ebracteate, sometimes up to 6–9 in. long. Calyx ¾ lin. long, hairy outside; lobes oblong, obtuse. Corolla 2–3 times as long as the calyx; tube subcylindric, densely pubescent outside; lobes ovate, acute, undulate. Anthers inserted above (not below as *A.DC.* states) the middle of the corolla-tube. Ovary ovoid; style filiform, glabrous; stigma ovoid-conic. Fruit globose, 1 lin. in diam.; nutlets 4, glabrous, rugose.—Vatke in Linnæa, xliii. 317; Hiern in Cat. Afr. Pl. Welw. i. 720. *Heliophytum longiflorum*, A.DC. l.c.

Nile Land. Nubia: Hor Tamanib, *Lord!* between Suakin and Berber, *Schweinfurth*, 289! 409! Abyssinia, *Plowden!* Somaliland: Boobi, *James & Thrupp!* British East Africa: Lake Rudolph, *Wellby!* Ndi, *Hildebrandt*, 2634! Mombasa, *Hildebrandt*, 1982!

Lower Guinea. Angola: Mossamedes: at the mouth of the River Giraul, *Welwitsch*, 5294! banks of the River Bero, *Welwitsch*, 5291!

Mozamb. Dist. German East Africa: Vidunda Mountains, *Goetze*, 416! Portuguese East Africa: near Lupata, *Kirk!*

Also in Arabia.

29. **H. Steudneri**, *Vatke in Oest. Bot. Zeitschr.* 1875, 167. Perennial. Stems slender, virgate, woody, densely clothed with short adpressed whitish hairs. Leaves ovate-lanceolate, 15 lin. long, 6 lin. broad, slightly crisped at the edge, densely pubescent on both surfaces; petioles 3 lin. long. Spikes short, dense, ebracteate. Calyx 1 lin. long, densely hairy; tube short; lobes linear, obtuse. Corolla-tube twice as long as the calyx, hairy; lobes small, oblong. Stamens inserted above the middle of the corolla-tube. Style slightly pilose or glabrous; stigma produced at the apex, obscurely bilobed. Fruit not longer than the calyx; nutlets 4.—Linnæa, xliii. 318, 320; Engl. Hochgebirgsfl. Trop. Afr. 352; Schweinf. in Ghika, Pays des Somalis, 211.

Nile Land. Nubia: Erkowit Mountain, *Schweinfurth*, 793! Eritrea: Bogos, 6000 ft., *Hildebrandt*, 469, *Beccari*, 145; between Saganeiti and Acrur, 6000–7000 ft., *Schweinfurth & Riva*, 999! Somaliland: by the River Boholodimu, *Ghika*. British East Africa: Duruma; Tchamtei, *Hildebrandt*, 2338.

30. **H. dissimile**, *N. E. Br.* Perennial? about 2½ ft. high; branches herbaceous, with spreading pubescence. Leaves spreading, 1¼–2½ in. long, 3–6 lin. broad, oblong-lanceolate, obtuse or subacute, tapering to an acute base, finely pubescent on both surfaces; petiole 1–2 lin. long. Cymes 2-branched; peduncles 3–4 in. long, spreadingly pubescent; branches 1¼–2¼ in. long; flowers sessile. Sepals 1½–2 lin. long, erect, linear, obtuse, spreadingly pubescent. Corolla 3 lin. or rather more in diam., white; tube 2½ lin. long, ⅔ lin. in diam., cylindric, adpressed pubescent; limb 5-lobed to about half-way down; lobes 1 lin. long, 1 lin. broad, oblong or subquadrate, very obtuse or almost truncate, glabrous. Fruit unknown.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe Hills, 3400 ft., in dry sandy places, *Mrs. Lugard*, 77! *Lugard*, 139!

Near *H. longiflorum*, Hochst. & Steud., but calyx-segments much longer and corolla larger.

31. **H. somalense,** *Vatke in Oest. Bot. Zeitschr.* 1875, 166. Perennial. Stems slender, virgate, clothed with short adpressed whitish bristles. Leaves flat, linear, the lower shortly petioled, 1–2 in. long, thinly strigose. Spikes moderately dense, ebracteate, finally 2 in. or more long. Calyx under 1 lin. long; tube very short; lobes lanceolate. Corolla-tube cylindric, $1\frac{1}{2}$ lin. long; pubescent outside; limb white, 1 lin. in diam.; lobes broadly triangular, obtuse. Stamens inserted about the middle of the corolla-tube. Style glabrous; stigma with a conical 2-lobed crest. Fruit $1\frac{1}{2}$ in. in diam.; nuts 4, glabrous, tubercled.

Nile Land. British Somaliland: Ahl Mountains, at Damalle, 3000 ft., *Hildebrandt,* 846B, and without precise locality, *Mrs. Lort Phillips!*

Also in Arabia.

32. **H. Eduardi,** *Martelli, Florul. Bogos.* 59. Stem erect, shrubby at the base, branched, scabrid. Leaves elliptic-oblong, acute, tapering into a short petiole, $1\frac{1}{2}$–4 in. long, 4–9 lin. broad, entire, scabrid above, setose beneath chiefly on the prominent nerves. Cymes spicate, axillary and terminal, simple or forked, many-flowered, ebracteate. Calyx about $1\frac{1}{2}$ lin. long in flower, longer in fruit, setose, divided nearly to the base into 5 linear-lanceolate lobes. Corolla about 3 lin. long; tube subcylindric, pubescent outside; lobes plicate-undulate. Stamens inserted about the middle of the corolla-tube; anthers elliptic, acute. Style columnar, glabrous, nearly 1 lin. long; stigma subulate, as long as the style, minutely 4-toothed at the apex.

Nile Land. Eritrea: Keren, *Beccari,* 145! British East Africa: Kilimanjaro Exped.; 40–60 miles from the coast, *Johnston!*

Mozamb. Dist. German East Africa: Usambara; Hosiga, *Holst,* 2531!

Imperfectly known species.

33. **H. glomeratum,** *Terracc. in Bull. Soc. Bot. Ital.,* 1892, 424. Leaves linear-subulate, clustered at the nodes. Spike short; flowers sessile. Calyx strigose. Nucules smooth, very hairy.

Nile Land. Somaliland: Gerar-Amaden, *Terracciano.*

34. **H. africanum,** *Schumach. & Thonn. Beskr. Guin. Pl.* 87. Stems subherbaceous, branched, procumbent, densely hairy upwards. Leaves ovate, 2–3 in. long, acuminate, narrowed to the base, rugose, glabrous when mature. Spikes leaf-opposed, peduncled, long, ebracteate. Calyx-tube short; lobes subulate, erect. Corolla pale blue; tube 3 times the length of the calyx, contracted and naked at the thoat; lobes orbicular. Anthers inserted in the middle of the corolla-tube, oblong, acute. Stigma capitate. Nuts 4, ovoid, subacuminate.—DC. Prodr. ix. 548.

Upper Guinea. Guinea, *Thonning.*

35. **H. katangense,** *Gürke in De Wild. Études Fl. Katanga,* iii. 223. Stem about 1 ft. high, suberect, branched, hoary-pubescent.

Leaves oblong, acute, 3–7 lin. long, 1½–4 lin. wide, tapering towards the base, entire, hoary on both surfaces and furnished with adpressed bristles. Flowers often solitary; pedicels about 1 lin. long. Calyx funnel-shaped, divided nearly to the base; lobes 5, lanceolate, acute, the anterior 2 lin. long, the rest slightly shorter. Corolla-tube 1 lin. long; limb funnel-shaped about 2 lin. long; teeth 5, triangular, obtuse, ½–¾ lin. long, also 5 accessory alternating with the others. Anthers 5, sessile, ½ lin. long, shortly apiculate, puberulous. Stigma ½ lin. long. Nutlets 2 lin. long.

South Central. Congo Free State: Katanga; Lukafu, *Verdick*, 141, 182.

8. **TRICHODESMA**, R. Br.; Benth. et Hook. f. Gen. Pl. ii. 845.

Calyx deeply 5-lobed, accrescent; lobes finally rounded or cordate at the base. Corolla-tube short; throat naked; lobes 5, broad or narrow; sinuses often incurved. Stamens 5, inserted at the throat of the corolla-tube; filaments very short, flattened; anthers linear, connivent with the connective more or less produced above the cells and often spirally twisted. Ovary 4-lobed, ovoid; style long, subulate; stigma small; ovules nearly horizontal. Nuts 4, ovoid, triquetrous on the inner face, by the lower part of which they are attached to the broad receptacle, often margined, smooth or tubercled on the back. Seeds subglobose or obovoid, horizontal or pendulous; embryo straight or rather curved; cotyledons plano-convex; radicle short.—Erect herbs, often bristly and tubercled. Leaves alternate or subopposite. Flowers in terminal cymes, blue or white.—*Pollichia*, Medic. Bot. Beobacht. 247.

Species about 15, also North African, Asiatic, and Australian.

Awns of anthers straight.
- Connective glabrous at the back; corolla-lobes narrow.
  - Leaves 1½–3 in. long, green . . . . . 1. *T. Medusa.*
  - Leaves ½ in. long, silvery . . . . . 2. *T. heliocharis.*
- Connective puberulous on the back; corolla-lobes broad . . . . . 3. *T. hispidum.*

Awns of anthers contorted; connective pilose on the back in the lower part.
- Calyx glabrous or slightly hairy . . . . 4. *T. physaloides.*
- Calyx copiously hairy.
  - *Stems woody.
    - Branches glabrous . . . . . 5. *T. droogmansianum.*
    - Branches hairy.
      - Cymes many-flowered . . . . 6. *T. Schimperi.*
      - Cymes few-flowered.
        - Leaves linear or linear-lanceolate . . 7. *T. lanceolatum.*
        - Leaves lanceolate . . . . . 8. *T. oleæfolium.*
        - Leaves ovate or oblong.
          - Corolla-lobes long cuspidate . . 9. *T. Hildebrandtii.*
          - Corolla-lobes minutely cuspidate . 10. *T. pauciflorum.*

**Stems herbaceous.
Calyx glabrous . . . . . 11. *T. glabrescens.*
Calyx-lobes with larger hairs on the midrib and margins . . . . . 12. *T. africanum.*
Calyx equally hairy all over.
Leaves ovate.
Pedicels with adpressed hairs.
Margin of nutlet smooth . . . 13. *T. calathiforme.*
Margin of nutlet tuberculate . . 14. *T. grandifolium.*
Pedicels with spreading hairs . . 15. *T. Bentii.*
Leaves ovate-lanceolate . . . . 16. *T. arenicola.*
Leaves lanceolate.
Inflorescence an almost simple raceme . 17. *T. dekindtianum.*
Inflorescence much-branched . . 18. *T. Baumii.*
Leaves oblong-lanceolate . . . . 19. *T. zeylanicum.*

1. **T. Medusa,** *Baker in Kew Bulletin*, 1894, 29. An undershrub, with hairy stems 3–6 feet long. Leaves subsessile, lanceolate, 1½–3 in. long, acute, entire, rounded at the base, subcoriaceous, with scattered adpressed hairs on both surfaces. Flowers many; pedicels long; peduncle hairy. Calyx 2½ lin. long; lobes narrowly triangular, acute, clothed with adpressed hairs. Corolla blue, 3–4 times the length of the calyx; tube 2 lin. long; lobes linear-lanceolate, about 7 lin. long, hairy outside. Stamens as long as the corolla-lobes; filaments 2 lin. long; anthers about 7 lin. long, with a long straight glabrous or slightly pubescent point.—Gürke in Warb. Kunene-Samb. Exped. 349. *T. macrantherum*, Gürke in Engl. Jahrb. xxxii. 142. *Borraginoides Medusa*, Hiern in Cat. Afr. Pl. Welw. i. 721.

Lower Guinea. Angola: Huilla; Humpata Plateau, *Welwitsch*, 5302! *Johnston! Dekindt*, 8; by the River Chitanda, near Kassinga, 4300 ft., *Baum*, 928!

2. **T. heliocharis,** *S. Moore in Journ. Bot.* 1877, 68. An undershrub, with slender woody branches, densely clothed with adpressed white hairs. Stem-leaves 6 lin. long, 1½ lin. wide, sessile, entire, oblanceolate with recurved edges, acute, subcoriaceous, densely clothed on both sides with adpressed white bristly hairs. Flowers several to a branch in a dense compound terminal cyme; bracts minute, linear; pedicels sometimes longer than the calyx. Calyx 3 lin. long; lobes linear, densely hispid. Corolla-tube short; lobes lanceolate, acuminate, 4 lin. long, 1 lin. broad, pubescent outside. Anthers hairy at the base in front only, 1½ lin. long; awns 2 lin. long, flat, connate, glabrous. Nutlets keeled on the ventral side, verrucose on the dorsal, slightly beaked.—Vatke in Linnæa, xliii. 322; Engl. Hochgebirgsfl. Trop. Afr. 352. *T. stenosepalum*, Baker in Kew Bulletin, 1895, 221.

Nile Land. British Somaliland: Serut Mountains, near Maid, 5900 ft., *Hildebrandt*, 1417! and without precise locality, *Miss Edith Cole!*

3. **T. hispidum,** *Baker & C. H. Wright.* Stem much-branched, slightly woody, terete, densely and patently hispid. Leaves (the upper only seen) alternate, oblong, slightly narrowed to both ends, up to 4 lin. broad, densely covered with bulbous-based hairs on both surfaces.

Cymes racemose, arranged in a terminal panicle, densely and patently hispid all over, up to 8 in. long in fruit; pedicels 4 lin. long in flower, 6 lin. in fruit. Calyx-lobes 3 lin. long, linear, densely hairy on both surfaces. Corolla 8 lin. in diam.; lobes ovate-lanceolate, $3\frac{1}{2}$ lin. long, $2\frac{1}{2}$ lin. wide, pubescent on the outside of the midrib and inside across the base. Anthers $1\frac{1}{2}$ lin. long; cells narrow, widely separated; connective 2 lin. long, puberulous on the back. Nutlets 2 lin. long, obliquely pyramidal, densely white verrucose all over.

Nile Land. British East Africa: Kikuya and on the road to Eldama Ravine, 4000–6000 ft., *Whyte!* near Lake Elmeteita, *Scott-Elliot*, 6640!

4. **T. physaloides,** *A.DC. in DC. Prodr.* x. 173. Rootstock tuberous, perennial. Stems annual, erect, 1–2 ft. high, hirsute or glabrous, not much branched. Leaves usually opposite, sessile, ovate-lanceolate or lanceolate, acute, $1\frac{1}{2}$–4 in. long, 8–12 lin. wide, with white tubercles on both surfaces, but more numerous on the upper. Panicle lax, many-flowered; pedicels slender, glabrous or pubescent, finally 1–2 in. long. Calyx 6 lin. long in flower, glabrous, pubescent or with bulbous-based hairs; lobes broadly lanceolate, becoming suborbicular, cuspidate, cordate at the base and 1 in. long in fruit. Corolla up to $1\frac{1}{2}$ in. in diam., white, blue, or white with 5 blue spots in the throat, or blue with 5 yellow spots, with 5 folds in the throat alternating with the lobes; lobes short, rounded, more or less cuspidate, pilose on the midribs outside. Anthers lanceolate, densely pilose on the back, 4 lin. long; awns nearly as long as the anthers, flat, contorted. Style subulate. Nutlets smooth on the ventral side; margins inflexed and papillose-denticulate.—Vatke in Oest. Bot. Zeitschr. 1875, 168; Rolfe in Oates, Matabele Land, ed. ii. 404; C. H. Wright in Dyer, Fl. Cap. iv. ii. 11. *T. ambacensis*, Welw. Apont. Phyto-Geogr. 589. *Friedrichsthalia physaloides*, Fenzl in Endl. Nov. Stirp. Decas vii. 54. *Borraginoides physaloides*, Hiern in Cat. Afr. Pl. Welw. i. 721. *Boraginella ambacensis* and *B. physaloides*, O. Kuntze, Rev. Gen. Pl. ii. 435.

Nile Land. Fazokl, *Kotschy*, 577! Bahr el Ghazal, *Broun!* Mittu: Ngama, *Schweinfurth*, 2776!

Lower Guinea. Angola: Ambaca; near Puri Cacarambola, *Welwitsch*, 5450!

Mozamb. Dist. German East Africa: Urundi Hills, *Scott-Elliot*, 8387! British Central Africa: Urungu; Fwambo, *Carson!* between Lakes Nyasa and Tanganyika, *Thomson!* by the River Kalangwizi, *Carson*, 9! Nyasaland; Loangwena, *Nicholson!* Nacheri Hill, 7500 ft., *McClounie*, 92! Mount Masisi, 3000–4000 ft., *McClounie*, 125! Mandala, *Scott-Elliot*, 8504! Blantyre, *Buchanan*, 31! Zomba, *Purves*, 1901! *Miller! Whyte!* Mount Mlanji, *Whyte!* Mashonaland, *Bryce! Mrs. Evelyn Cecil!* Matabeleland, *Elliott! Oates!*

Also in South Africa.

This species varies greatly in the colour of the corolla and the hairiness of the stem and calyx, but these characters cannot be grouped in such a manner as to form satisfactory varieties. According to Meller the leaves yield an "oily secretion on being rubbed or pressed, which is insipid and without odour."

5. **T. droogmansianum,** *De Wild. & Durand in Comptes-rendus Soc. bot. Belg.* xxxix. 69. An undershrub; stems glabrous. Leaves sessile, opposite, elliptic, 1½–2 in. long, acute, rather rounded at the base, thick, with scattered white bulbous-based hairs on both surfaces. Cymes terminal, 4–7-flowered; pedicels about 1 in. long, subglabrous or hairy towards the top. Calyx 8 lin. long; lobes ovate-lanceolate, acute, 2½ lin. wide. Sparsely tubercled and hispid. Corolla-tube 4 lin. long; lobes broadly ovate, cuspidate, as long as the tube, 4½ lin. wide, spreading. Anthers long, clothed with long white hairs on the back; awn long, subulate, twisted. Ovary depressed; style filiform; stigma nearly simple.

South Central. Congo Free State: by the River Lualaba, *Descamps*.

6. **T. Schimperi,** *Baker*. Shrubby, much branched; branchlets shortly and densely hispid. Leaves opposite, shortly hispid, the upper ovate, sessile, about 1 in. long, the lower oblong, rather larger, narrowed to a short petiole. Cymes many-flowered; pedicels slender, very hairy, the lower 6 lin. long. Calyx densely hairy on both surfaces, 3 lin. long at the flowering time; segments ovate, cuspidate, cordate at the base. Corolla-tube 3 lin. long; expanded limb nearly 1 in. in diam.; lobes triangular, cuspidate, 5 lin. long, 2 lin. broad at the base. Anthers 2 lin. long, lanceolate, pilose on the back; awns nearly as long as the anthers, flat, contorted. Nuts ovoid, 3 lin. long, with a serrated inflexed margin and rugose back.

Nile Land. Abyssinia: Begemeder; Ebenat, *Schimper*, 1472! and without precise locality, *Roth!*

7. **T. lanceolatum,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxx. 269. Erect, suffruticose, with strigose branches. Leaves sessile, linear or linear-lanceolate, acute, narrowed to the base, 1–2½ in. long, 1–4 lin. broad. Cymes lax; pedicels above 6 lin. long. Calyx at the flowering time 6 lin. long; segments lanceolate, acuminate, cordate at the base. Corolla-tube 6 lin. long; lobes broad lanceolate, cuspidate. Anthers with long awns. Nuts ovoid or ovoid-lanceolate, acute, with a deeply toothed inflexed margin and glochidiate back.

Lower Guinea. Hereroland: Otyiheveta, *Schinz*.
Also in Great Namaqualand.

8. **T. oleæfolium,** *Baker*. Shrubby, much branched; branchlets finely pubescent, not bristly. Leaves subopposite, lanceolate, acute, canescent, the upper sessile, the lower 2–3 in. long, obscurely petioled. Cymes few-flowered, lax, terminal; pedicels strigose, 6–9 lin. long. Calyx-lobes thinly strigose, lanceolate, acuminate, finally 6 lin. long, not cordate at the base. Corolla-limb white with an orange spot at the base of the lobes, 1 in. in diam.; lobes suborbicular with a small cusp. Anthers hairy, 2 lin. long; awn as long as the cell, flat, contorted. Nuts oblong, with a narrow crenate wing.—*Streblanthera oleæfolia*, A. Rich. Tent. Fl. Abyss. ii. 93, t. 78.

Nile Land. Abyssinia: Chelicut, *Petit!*

9. **T. Hildebrandtii,** *Gürke in Notizbl. Königl. Bot. Gart. Berl.* i. 61. An undershrub with hispid and pubescent branches. Leaves shortly petioled or subsessile, ovate or oblong, 1–1½ in. long, rather acute, narrowed to the base, rough. Flowers 2–5 from the axils of the reduced upper leaves; pedicels 6 lin. long. Calyx-lobes ovate-lanceolate, acuminate, 6 lin. long, hairy, deeply cordate at the base. Corolla-lobes with a long point. Nucules 3 lin. long; margin spinose-dentate; back furnished with rigid deflexed dense spreading pilose spines; face shortly pubescent.

Nile Land. British Somaliland: Ahl Mountains, 3000 ft., *Hildebrandt*, 847A.

10. **T. pauciflorum,** *Baker in Kew Bulletin*, 1894, 29. Shrubby, much branched, with shortly strigose branchlets. Stem-leaves opposite, shortly petioled, ovate with a rounded base, 1–1½ in. long, with many white tubercles and short whitish bristly hairs. Cymes few-flowered; pedicels short, slender, finely strigose. Calyx at the flowering time 6 lin. long, shortly strigose; segments lanceolate, not cordate at the base. Corolla-tube 2 lin. long; lobes broad ovate, minutely cuspidate, 4 lin. long. Anthers 3 lin. long; crest long, convolute, woolly below. Nuts not seen.

Nile Land. Harnish Island, in the Red Sea, *Slade*, 5!

11. **T. glabrescens,** *Gürke in Engl. Jahrb.* xxx. 389. Stems glabrous, 1½–2 ft. long. Leaves sessile, broadly lanceolate or rarely oblong, 2–3 in. long, entire, acute or acuminate, glabrous on both surfaces. Cymes with very long pedicels and linear bracts. Calyx glabrous; lobes broadly lanceolate, very acuminate, 8 lin. long. Corolla ⅔–1 in. long, white, with 5 long brown marks; lobes broadly deltoid, mucronate. Anthers 6 lin. long, villous on the back, with a long twisted tip.

Mozamb. Dist. German East Africa: Kinga Mountains, 7000 ft., *Goetze*, 1267.

12. **T. africanum,** *R. Br. Prodr.* 496. An annual. Stems erect, branched, up to 3 ft. high, furnished with scattered rigid white bulbous-based hairs. Leaves opposite or alternate, ovate or ovate-oblong, acute, up to 5 by 2½ in., with scattered white bulbous-based hairs on both surfaces, the uppermost sessile, the rest petioled. Panicle many-flowered, terminal; pedicels up to 6 lin. long, covered (like the outside of the calyx) with stiff white hairs 1 lin. long. Calyx-lobes lanceolate, 3–4 lin. long at flowering time. Corolla scarcely exserted from the calyx, blue; throat yellow with 5 purple spots; lobes rounded, produced into an apiculus ¾ lin. long. Anthers lanceolate; awn nearly as long as the cells, twisted, hairy outside in the lower part. Style filiform, glabrous. Nutlets 4, ovoid, scabrid, rugulose on the ventral side, margin raised, white and spiny.—Lehm. Pl. Asper, 195; Roem. & Schult. Syst. Veg. iv. 69, 753; A.DC. in DC. Prodr. x. 173; Vatke in Oest. Bot. Zeitschr. 1875, 168; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 154; C. H. Wright in Dyer, Fl. Cap. iv. ii. 11. *Borago africana*, Linn. Sp Pl. ed. 2, 197; Burm. Prodr. 4; Thunb. Fl. Cap. ed. Schult. 161. *B. verrucosa*, Forsk. Fl. Ægypt.-Arab. 41. *Pollichia africana*, Medic. Bot. Beobacht.

248; Phil. Bot. i. 32. *Borraginoides aculeata*, Moench, Meth. 516. *B. africana*, Hiern in Cat. Afr. Pl. Welw. i. 721. *Boraginella africana*, O. Kze. Rev. Gen. Pl. ii. 435.

Upper Guinea. Northern Nigeria: Kuka, *Vogel*, 43! Borgu, *Barter*, 770!

Nile Land. Eritrea: Arrot Valley, 4400 ft., *Schweinfurth & Riva*, 1409! Abyssinia: Mount Sholoda, *Schimper*, 311! Beschilo Valley near Magdala, *Steudner*, 859!

Lower Guinea. Angola: Mossamedes; banks of the River Bero, *Welwitsch*, 5303! hills near Boa Vista, *Gossweiler*, 81!

Also in South Africa, Cape Verde Isles, North Africa, and through the Orient to Scind.

13. **T. calathiforme,** *Hochst. in Flora*, 1844, 29. Stems herbaceous, densely clothed with short bristly hairs. Leaves opposite, densely bristly on both sides, the upper ovate, sessile, the lower large, oblong, narrowed to the base. Cymes lax; pedicels long, slender, densely bristly. Calyx densely clothed with adpressed bristly hairs 6 lin. long in the flowering stage; segments at first oblong-lanceolate, finally broad ovate, cuspidate. Corolla-limb 1 in. in diam.; segments with a large cusp from a broad ovate base. Anthers 3 lin. long; connective longer than the anthers, convolute, hairy below. Nuts ovoid, 2–3 lin. long, with a thick inflexed entire wing, and nearly smooth back.—DC. Prodr. x. 173; Engl. Hochgebirgsfl. Trop. Afr. 352. *Friedrichsthalia trichodesmoides*, Bunge, Delect. Sem. Hort. Dorpat. 1843, 7; Schweinf. Beitr. Fl. Aethiop. 115. *Streblanthera trichodesmoides*, Steud. ex Hochst. in Flora, 1844, 29; A. Rich. Tent. Fl. Abyss. ii. 92.

Nile Land. Abyssinia: Adowa, *Petit*, 414! near Selassaquilla, and near Jelajeranne, *Schimper*, and without precise locality, *Schimper*, 710! British Somaliland, *Miss Edith Cole! Révoil* (ex *Franchet*).

14. **T. grandifolium,** *Baker in Kew Bulletin*, 1894, 29. Stems slender, herbaceous, armed with short ascending white bristles. Leaves thin, scabrid, opposite, ovate, the upper sessile with a broadly rounded base, the lower shortly petioled, 5–6 in. long by half as broad. Cymes lax, many-flowered; pedicels very slender, clothed with adpressed bristly hairs, the lower 1 in. long. Calyx 6 lin. long in the flowering stage, 10 lin. in fruit; segments strigose, broad ovate with a large cusp. Corolla-limb 1 in. in diam.; lobes suborbicular with a small cusp. Anthers much shorter than the corolla-lobes; appendages as long as the cells, convolute, woolly below. Nutlets deeply concave on the back and with a central row of tubercles, tuberculate on the sides.

Nile Land. Somaliland: at Adda Galla and Lafarug, *James & Thrupp!* Dooloo, *Miss Edith Cole!* and without precise locality, *Mrs. Lort Phillips!*

15. **T. Bentii,** *Baker & C. H. Wright.* An erect herb, about 1 ft. high. Stem densely covered with white hairs interspersed with larger patent bristles. Leaves opposite, ovate, $2\frac{1}{2}$ in. long, nearly 2 in. wide, hispid, and with scattered bulbous-based hairs above, simply but

densely hispid beneath; petiole up to 1 in. long. Cymes terminal, paniculate. Calyx 2½ lin. long; lobes ovate-lanceolate, 1 lin. wide at the base, hairy outside and on the margin. Corolla 4–5 lin. in diam.; tube very short; lobes broadly triangular, acuminate, sides rounded and overlapping near the base. Anthers pilose on the back, 1 lin. long; awns as long as the anthers, contorted at the apex.

Nile Land. Nubia: about 21° N. lat., sea-coast to between 3000 to 4000 ft., *Bent!*

16. **T. arenicola,** *Gürke in Engl. Jahrb.* xxxii. 143. Rootstock thick. Stems pubescent, 8–16 in. long. Leaves sessile, lanceolate or ovate-lanceolate, 1–2 in. long, entire, acute, clothed on both surfaces with scattered hairs, some of them bulbous-based. Flowers 6–15 in a terminal cyme; pedicels ½–1 in. long. Calyx divided almost to the base, very accrescent, above ½ in. long in flower; lobes ovate, rounded at the base. Corolla-lobes broadly ovate, shortly mucronate. Anthers densely pilose on the back; connective subulate, membranous, glabrous. Nutlets smooth in front, velvety on the back, edged with narrowly triangular pilose teeth.—Baum, Kunene-Samb. Exped. 348.

Lower Guinea. Southern Angola: by the River Chitanda, between Goudkopje and Kakele, 3900 ft., *Baum*, 195! near Huilla, 5600 ft., *Dekindt*, 40; and without precise locality, *Antunes*, 120, 317.

17. **T. dekindtianum,** *Gürke in Engl. Jahrb.* xxxii. 142. A perennial, 8–16 in. high. Stems erect, woody below and hirsute with hooked bulbous-based hairs, glabrescent above. Leaves sessile, lanceolate, narrowed at the base, acute, entire, hispid on both surfaces, 1–1½ in. long, 2–4 lin. broad. Racemes 4–10-flowered. Flowering calyx 6 lin. long, deeply lobed; lobes lanceolate, acuminate, not cordate at the base; fruiting calyx 1 in. long, 9 lin. across; lobes broadly ovate, acute, cordate at the base. Corolla 1 in. or rather more across; lobes broadly ovate, acuminate. Anthers densely pilose on the back, about 6 lin. long. Nutlets about 6 lin. long and 5–6 lin. broad, smooth on the face, velvety on the back, surrounded by inflexed glochidiate teeth.—Baum, Kunene-Samb. Exped. 348, fig. 106.

Lower Guinea. Southern Angola: in the Maramba near Kuelleis, between Kassinga and the River Kubango, 4500 ft., *Baum*, 234! hills near Luala, *Dekindt*, 77.

18. **T. Baumii,** *Gürke in Baum, Kunene-Samb. Exped.* 349. A shrub, about 3 ft. high; stem hirsute, not much branched. Leaves sessile, lanceolate, entire, acute, with strigose adpressed hairs on both surfaces. Peduncles up to 17 lin. long, hirsute. Calyx divided almost to the base, with adpressed hairs outside; lobes 5, narrowly triangular, acuminate, 6 lin. long. Corolla blue; tube about 3 lin. long; lobes 5, 5 lin. long, contorted in bud, acuminate. Anthers elongated at the apex, contorted. Fruit unknown.

Lower Guinea. Southern Angola: near Manonge, on the upper part of the River Kwebe, 4400 ft., *Baum*, 844!

19. **T. zeylanicum,** *R. Br. Prodr.* 496. Annual. Stems erect, 3–4 ft. high; branches pubescent and with scattered bulbous-based hairs. Leaves opposite or the upper alternate, subsessile, oblong-lanceolate, tapering at the base, 1–3 in. long, pubescent and with bulbous-based hairs on both surfaces; lower leaves larger, shortly petioled. Cymes lax, terminal; pedicels long, slender, densely hairy, patent hispid. Sepals ovate-lanceolate, not cordate at the base, very hairy on both surfaces, finally 6–9 lin. long. Corolla slightly longer than the calyx, 6 lin. in diam., blue with a white eye; lobes 1½ lin. long, 3 lin. broad, rounded at the sides, produced at the apex into an acumen 1 lin. long. Anthers lanceolate, 1½ lin. long; awn nearly as long as the cell, contorted, hairy below. Ovary conical, glabrous; style long subulate. Nutlets ovoid, compressed, slightly rugose on the ventral side, smooth, grey and glossy on the back, 2 lin. long.—DC. Prodr. x. 172; A. Rich. Tent. Fl. Abyss. ii. 91; Klotzsch in Peters, Reise Mossamb. Bot. 255; Schweinf. Beitr. Fl. Aethiop. 117; Bot. Mag. t. 4820; Benth. Fl. Austral. iv. 404; Baker, Fl. Maurit. 202; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 154; Engl. Hochgebirgsfl. Trop. Afr. 352; Gregory, Great Rift Valley, 395. *T. kotschyanum,* Fenzl ex A.DC. in DC. Prodr. x. 172. *Borago zeylanica,* Burm. f. Fl. Ind. 41, t. 14, fig. 2; Linn. Mant. 202; Jacq. Ic. t. 314. *Pollichia zeylanica,* F. Muell. Census, ed. i. 100. *Borraginoides zeylanica,* Hiern in Cat. Afr. Pl. Welw. i. 720. *Boraginella zeylanica,* O. Kuntze, Rev. Gen. Pl. ii. 435.

Nile Land. Fazokl, *Kotschy,* 542! Khartoum, *Heuglin.* Abyssinia: near Jelajeranne, *Schimper,* 625! Aguar Valley, *Schimper,* 1025! and without precise locality, *Schimper,* 68! 208! Jur: Jur Ghattas, *Schweinfurth,* 1295! Muru: near the River Bibia, *Petherick!* British East Africa: Mele, *Kässner,* 244! near Mombasa, *Scott-Elliot,* 6126! Shimoni, *Whyte!* Witu, Nzaoi, and Iveti Mountains, *Gregory.*

Lower Guinea. Angola: Huilla; between Mumpullo and Nene, *Welwitsch,* 5301!

Mozamb. Dist. German East Africa: Kilimanjaro; "Kwa Kinabo," *Volkens,* 1982! Usambara; Lutindi, *Holst,* 3452! Usaramo; Dar es Salaam, *Hildebrandt,* 1219! Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* near Lake Nyasa, *Johnson,* 53! 368! British Central Africa: Upper Shire Valley, *Meller!* Nyasaland; near Zomba, *Whyte!* Kondowe to Karouga, *Whyte!* near the Umbaka River, *Scott!*

Also in the Mascarene Isles, India, Malaya, and Australia.

9. **CYNOGLOSSUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 848.

Calyx deeply 5-lobed, not accrescent. Corolla-tube short, closed with scales at the throat; lobes 5, orbicular, patent, imbricate; stamens 5, inserted in the corolla-tube; filaments very short; anthers oblong, obtuse. Ovary with 4 depressed lobes; style long or short; stigma minute, capitate; ovules horizontal. Nuts 4, depressed, convex on the back, muricate. Seeds straight or slightly curved; cotyledons broad, flat; radicle short.—Perennial or biennial herbs. Leaves many, alternate; radical petioled.

Cymes racemose; flowers stalked or nearly sessile; fruit pedicels recurved. Corolla blue or whitish, often veined.

Species about 60, widely spread in the tropical and temperate regions of both hemispheres.

Spines on the nutlets marginal and in a central row.
Plants slender, weak . . . . . 1. *C. Hochstetteri.*
Plants rigid.
Leaves less than 1 in. wide.
Corolla 2 lin. long . . . . . 2. *C. geometricum.*
Corolla 1 lin. long . . . . . 3. *C. Mannii.*
Leaves 2 in. or more wide . . . . . 4. *C. lancifolium.*
Spines all over the nutlets.
Fruit 5 lin. in diam. . . . . 5. *C. amplifolium.*
Fruit less than 3 lin. in diam.
Corolla blue; pedicels 2–4 lin. long in fruit, recurved . . . . . 6. *C. cæruleum.*
Corolla white, sometimes flushed with blue; pedicels short in fruit . . . . . 7. *C. lanceolatum.*

1. **C. Hochstetteri,** *Vatke ex Engl. Hochgebirgsfl. Trop. Afr.* 353. Stems short, very slender, hispid; leaves oblong, membranous, sparsely hispid; upper sessile; lower stem-leaves distinctly petioled. Racemes lax, few-flowered, bracteate at the base; lower flowering pedicels longer than the calyx. Calyx very hairy, 1 lin. long; tube short; lobes oblong, obtuse. Corolla-limb blue, $1\frac{1}{2}$ lin. in diam.; lobes oblong, obtuse, $\frac{3}{4}$ lin. long. Nutlets with a row of glochidiate spines with united bases around the margin and a row of smaller ones up the centre of the back. —*Echinospermum latifolium*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 89; Schweinf. Beitr. Fl. Aethiop. 114.

Nile Land. Nubia: coast-land, 3000–4000 ft., *Bent!* Abyssinia: near Mai Mezanno, *Schimper*, 1447! and without precise locality, *Schimper*, 578!

2. **C. geometricum,** *Baker & C. H. Wright.* A much-branched rigid herb. Stem erect, scabrid-pilose. Upper leaves sessile, lanceolate, slightly narrowed at the base, $1\frac{1}{2}$–3 in. long, 6–9 lin. wide, scabrid on both surfaces, the hairs on the upper surface more or less bulbous-based, those on the lower sometimes simple. Panicles terminal, few-branched; upper flowers ebracteate. Calyx 1 lin. long, adpressed-hairy outside; lobes ovate-oblong, 1-nerved. Corolla-tube campanulate, 1 lin. long; lobes orbicular, 1 lin. in diam. Anthers oval, $\frac{1}{2}$ lin. long. Nutlets 2 lin. in diam., glochidiate spines marginal and in a central row.

Nile Land. Uganda: Ruwenzori, 7000 ft., *Doggett!* British East Africa: between Eldama Ravine and Mau Plateau, 7000–8000 ft., *Whyte!*

Mozamb. Dist. British Central Africa: Nyasaland; Zomba, *Purves*, 1901! Mount Chiradzulu, *Whyte!* and without precise locality, *Buchanan*, 1145!

3. **C. Mannii,** *Baker & C. H. Wright.* An erect branched herb 4–6 ft. high. Stem terete, scabrid-pilose. Leaves oblong-lanceolate, acuminate at both ends, 4 in. long, about 9 lin. wide, sessile, with fine bulbous-based hairs on both surfaces. Panicles terminal, few-branched;

pedicels short. Calyx $\frac{3}{4}$ lin. long, adpressedly hairy outside; lobes broadly ovate. Corolla-tube $\frac{1}{2}$ lin. long; lobes $\frac{1}{2}$ lin. long, rounded. Anthers $\frac{1}{5}$ lin. long. Nutlets 2 lin. in diam., with a marginal and irregular median row of glochidiate spines.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–8000 ft., *Mann*, 2005 ?

4. **C. lancifolium,** *Hook. f. in Journ. Linn. Soc.* vii. 207. A herb 3–4 ft. high. Stem branched, hispid-pilose. Leaves hispid-pilose, cauline broadly oblong or ovate-lanceolate, acuminate, tapering into a short petiole, 3–4 in. long, 2–$2\frac{1}{2}$ in. wide; lateral nerves about 4 pairs almost parallel with the midrib. Cymes in a terminal panicle, up to 1 ft. long, bracteate below; pedicels 6–9 lin. long and deflexed in fruit. Calyx adpressed-hairy outside; lobes ovate, $1\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. wide. Corolla 3 lin. in diam., blue; tube campanulate; lobes rounded. Anthers $\frac{1}{2}$ lin. long. Nutlets 5 lin. in diam., with numerous glochidiate spines on the sides and a single row down the face.—Engl. Hochgebirgsfl. Trop. Afr. 353.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–9000 ft., *Mann*, 1266 ! 2004! *Johnston*, 10! 57!

5. **C. amplifolium,** *Steud. ex DC. Prodr.* x. 149. Stems tall, much-branched, densely and shortly hispid. Leaves large, ovate, acute, upper sessile, lower 5–6 in. long, often 3 in. broad, narrowed to a petiole. Cymes racemose, long, lax, sometimes bracteate at the base; pedicels 3–6 lin. long. Calyx $1\frac{1}{2}$ lin. long, densely hairy; tube longer than in the other species. Corolla-limb bright blue, 3 lin. in diam. Fruit 5 lin. in diam.; nuts globose, densely muricated.—A. Rich. Tent. Fl. Abyss. ii. 91.

Nile Land. Abyssinia: Samen; mountains at Enjedcap, *Schimper*, 564! Begemeder; Jan Meda, *Schimper*, 1538! Ankober, *Roth*, 435! and without precise locality, *Schimper*, 457! Uganda: Ruwenzori, *Scott-Elliot*, 7975.

Mozamb. Dist. German East Africa: Kilimanjaro, 10,000–11,000 ft., *Johnston!*

6. **C. cæruleum,** *Hochst. ex DC. Prodr.* x. 148. Stems erect, often short, densely hispid. Leaves hispid-pilose on both surfaces, the upper lanceolate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 3–5 lin. broad, sessile, the lower larger, petioled. Cymes panicled, up to 6 in. long, lax, ebracteate; lower pedicels 2–4 lin. long, much recurved in fruit. Calyx 1 lin. long, very hairy; lobes oblong, acute. Corolla bright blue, 2–3 in. in diam., lobes orbicular. Nutlets densely covered with glochidiate spines all over. —A. Rich. Tent. Fl. Abyss. ii. 90; Schweinf. Beitr. Fl. Aethiop. 114. *C. abyssinicum*, Hochst. ex Schweinf. l. c.; Engl. Hochgebirgsfl. Trop. Afr. 353. *C. cordifolium*, Hochst. ex Schweinf. l. c.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 512! between Harrar and Addi Abbaba, *Wellby!* and without precise locality, *Quartin-Dillon & Petit*, 88! *Schimper*, 1194! Uganda: Nandi Plateau, *Johnston! Whyte!*

British East Africa: Eldama Ravine and Mau, *Whyte!* Kikuyu, *Whyte!* Leikipia, *Thomson!* Sawi, *Kässner*, 752!

Var. *Johnstoni*, Baker & C. H. Wright. More robust than the type. Stem shaggy below. Radical leaves oblong, 5 in. long, 1 in. wide; petiole up to 2 in. long, slender.—*C. Johnstoni*, Baker in Kew Bulletin, 1894, 29.

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft. *Johnston!*

This species is very closely allied to *C. lanceolatum*, Forsk., but can be generally recognised by its pedicels being longer and more recurved in fruit.

7. **C. lanceolatum,** *Forsk. Fl. Ægypt.-Arab.* 41. Stems 4–6 ft. high, much branched, densely pilose. Leaves scabrid; upper lanceolate, sessile; lower oblong-lanceolate, 4–6 in. long, tapering into the petiole. Cymes very lax, ebracteate, finally 5–6 in. long; pedicels very short. Calyx densely hispid, 1 lin. long; tube short; lobes ovate, obtuse. Corolla white, sometimes suffused with blue, 1½ lin. in diam.; lobes small. Fruit 1½ lin. in diam.; nutlets covered all over with glochidiate spines.—Lehm. Pl. Asperif. 145; DC. Prodr. x. 155; Schweinf. Beitr. Fl. Aethiop. 114; Hiern in Cat. Afr. Pl. Welw. i. 721. *C. micranthum*, Desf. Tab. ed. i. 220; DC. l.c. 149; Hook. f. in Journ. Linn. Soc. vii. 207; Oliv. in Trans. Linn. Soc. xxix. 114; Engl. Hochgebirgsfl. Trop. Afr. 353; Gregory, Great Rift Valley, 395; C. H. Wright in Dyer, Fl. Cap. iv. ii. 14. *C. hirsutum*, Jacq. Hort. Schoenbr. iv. 45, t. 489. *Echinospermum cynoglossoides*, E. Meyer in Drège, Zwei Pflanzengeogr. Documente, 137, not of Lehm. *E. paniculatum*, E. Meyer, l.c. 134.

Upper Guinea. Liberia: Cape Palmas, *Vogel*, 18! Gold Coast, Lante, *Johnson*, 820! Lagos, *Millen*, 130!

Nile Land. Abyssinia: near Adowa, *Schimper*, 297! Shoa; Aliu Amba, *Roth*, 438! Lake Zuai, *Wellby!* and without precise locality, *Schimper*, 343! 525! 1007! *Parkyns! Quartin-Dillon & Petit*, 191! British Somaliland: Ahl Mountains, near Maid, 4600 ft., *Hildebrandt*, 1415! Niamniam, *Schweinfurth*, 3743! Uganda: Usogo villages, *Whyte!* Ruwenzori, *Scott-Elliot*, 7620! Nandi, *Scott-Elliot*, 6941! British East Africa: Kikuyu, *Whyte!* Ukamba, *Scott-Elliot*, 6746! 6492! Ndara, *Hildebrandt*, 2438!

Lower Guinea. Angola; Loanda; at Quicuxe, *Welwitsch*, 5448! Golungo Alto; near Sange, *Welwitsch*, 5449! Huilla; hills near Lopollo, *Welwitsch*, 5300!

Mozamb. Dist. German East Africa: Karagwe, *Speke & Grant!* Kilimanjaro, *Volkens*, 1661! Usambara, *Buchwald*, 227! *Holst*, 3383! British Central Africa: Nyasaland, *Scott-Elliot*, 8358! *Whyte*, 249! *Buchanan*, 43! 46! *McClounie!* Tropical Transvaal: Shilouvane, *Junod*, 832!

Also in South Africa, the Orient, India, China, Japan, and Malaya.

C. platyphyllum, Klotzsch in Peters, Reise Mossamb. Bot. 254 is probably identical with the common Mauritian *C. Rochelia*, A.DC., which is likely to occur on the mainland, but we have not seen any specimens.

10. **ANCHUSA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 855.

Calyx deeply 5-cleft, but little accrescent. Corolla hypocrateriform; tube straight, cylindrical; throat closed with scales; lobes short, patent, obtuse. Stamens 5, inserted above the middle of the corolla-tube,

included; filaments very short; anthers small, oblong, obtuse. Lobes of the ovary 4, attached to the narrow gynobase; style filiform; stigma entire or 2-lobed; ovules erect, inserted at the inner angle. Nuts 4, oblong, erect. Seeds straight; cotyledons flat, ovate.—Annual or perennial herbs, often very hispid. Leaves alternate. Racemes scorpioid, often long and leafy. Flowers blue or white, rarely yellow.

Species about 30; also in North and South Africa, Europe and Asia.

Perennial; stem slightly hispid	1. *A. affinis.*
Annual; stem very hispid	2. *A. Milleri.*

1. **A. affinis,** *R. Br. in Salt, Abyss. App.* 63. Perennial. Stems erect, 1–2 ft. long, but little hispid. Leaves with many short bristles from white tubercles; upper sessile, ovate or ovate-lanceolate; lower narrower, obtuse, narrowed into a short petiole. Spikes short, dense, panicled. Calyx very hispid, at first 2 lin., finally 3 lin. long; tube as long as the ovate segments. Corolla-tube as long as the calyx; limb blue, 3 lin. in diam. Nuts ovoid, reticulated, included in the calyx-tube.—DC. Prodr. x. 44; A. Rich. Tent. Fl. Abyss. ii. 87; Engl. Hochgebirgsfl. Trop. Afr. 354.

Nile Land. Eritrea, at 7000–7500 ft.: near Saganeiti, *Schweinfurth & Riva,* 784! 816! Asmara, *Schweinfurth & Riva,* 2091! Abyssinia: near Gennia, *Schimper,* 381! Shoho, *Petit!* and without precise locality, *Plowden!*

2. **A. Milleri,** *Willd. Enum. Hort. Berol.* i. 179. Annual. Stems hispid, much branched, very bristly. Leaves with many bristles and white tubercles; upper leaves sessile, oblong-lanceolate; lower narrow, obtuse, narrowed into a petiole. Flowers pedicellate, forming lax leafy racemes. Calyx very bristly, cleft nearly to the base, finally 3 lin. long; lobes lanceolate. Corolla-tube as long as the calyx; limb blue, finally 2 lin. in diam. Nuts $\frac{1}{3}$–$\frac{1}{2}$ as long as the calyx, oblong, glabrous, areolate.—DC. Prodr. x. 49; A. Rich. Tent. Fl. Abyss. ii. 88; Schweinf. Beitr. Fl. Aethiop. 114; Engl. Hochgebirgsfl. Trop. Afr. 354. *A. ryssosperma,* Steud. ex A. Rich. Tent. Fl. Abyss. ii. 88.

Nile Land. Abyssinia: Chelicut, *Petit.* Mount Sholoda, *Schimper,* 1142; near Bahar Amba, *Schimper,* 56; between Mount Buahit and Mount Dedjen, *Schimper,* 740.

Also in North Africa and Western Asia.

A. Magdalanæ, Schweinf. ex Engler, Hochgebirgsfl. Trop. Afr. 354, gathered by Steudner at Magdala, is known to us by name only.

11. **ARNEBIA,** Forsk.; Benth. et Hook. f. Gen. Pl. ii. 862.

Calyx deeply 5-lobed, slightly accrescent; lobes narrow. Corolla-tube cylindrical, straight, without scales at the throat; lobes 5, patent, orbicular. Stamens inserted about the middle of the corolla-tube; filaments very short; anthers oblong, obtuse. Ovary with 4 distinct lobes inserted on the narrow gynobase; style filiform, bifid; stigmas terminal, capitate; ovules erect. Nuts 4, erect, ovoid, rugose; cotyledons thick.—Annual or perennial hispid herbs. Stem-leaves alternate.

Flowers small, yellow or purple, arranged in scorpioid bracteate spikes or racemes.—*Toxostigma*, A. Rich. Tent. Fl. Abyss. ii. 86.

Species about 12, extending from North Africa through Western Asia to India.

Corolla yellow ; tube longer than the calyx . . .	1. *A. hispidissima.*
Corolla purple ; tube not longer than the calyx . .	2. *A. purpurascens.*

1. **A. hispidissima,** *DC. Prodr.* x. 94. Annual, much-branched, with stem, leaves and calyx densely clothed with spreading white bristly hairs. Root slender, fusiform, dyeing purple. Stem-leaves lanceolate, sessile, very hispid, $\frac{1}{2}$–1 in. long ; lower oblanceolate, obtuse, narrowed to the base. Spikes dense, many-flowered, finally elongated ; bracts ovate-lanceolate, lower as long as the flowers. Calyx 3 lin. long ; segments linear. Corolla yellow ; tube longer than the calyx, hairy ; limb 2 lin. in diam. Nuts slightly rugose.—Wight, Ic. t. 1393 ; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 176. *Lithospermum hispidissimum*, Lehm. Pl. Asper. t. 39. *Toxostigma luteum*, A. Rich. Tent. Fl. Abyss. ii. 86. *Anchusa asperrima*, Del. Fl. Ægypt. Illustr. 55. *Strobila hispidissima*, G. Don, Gen. Syst. iv. 327.

Upper Guinea. Northern Nigeria : Bornu ; Teli, *Vogel*, 91 !

Nile Land. Nubia : coast land, 3000–4000 ft., *Bent !* Sennar, *Kotschy*, 299 ! Kordofan : Kohn Mountain, *Kotschy*, 253 ! Helba, *Pfund*, 466 ! Om Gattia, *Muriel*, S 105 ! Eritrea : Arrot Valley, *Schweinfurth & Riva*, 688 !

Also in Egypt, and extending through the Orient to North India.

2. **A. purpurascens,** *Baker.* Annual, much-branched, with stem and leaves densely clothed with ascending white bristly hairs. Root slender, fusiform. Stem leaves sessile, lanceolate ; lower oblanceolate, obtuse, narrowed to the base. Spikes dense, finally 2–3 in. long ; bracts lanceolate, very hispid, as long as the flowers. Calyx 3–4 lin. long ; lobes linear. Corolla purple ; tube as long as the calyx ; limb small ; lobes rounded.—*Toxostigma purpurascens*, A. Rich. Tent. Fl. Abyss. ii. 87, t. 77.

Nile Land. Abyssinia : Adowa, *Petit*, 87 !

12. **SERICOSTOMA,** Stocks ; Benth. et Hook. f. Gen. Pl. ii. 861.

Calyx deeply 5-lobed, but little accrescent. Corolla-tube short, funnel-shaped, straight, hairy at the throat ; lobes 5, orbicular, patent. Stamens 5, inserted about the middle of the corolla-tube ; filaments filiform, about as long as the oblong obtuse anthers. Ovary with 4 distinct lobes inserted on the narrow gynobase ; style subulate ; stigma capitate, obscurely 2-lobed ; ovules erect. Nuts 4, hard, ovoid, erect, smooth or rugose. Seeds straight ; cotyledons flat, ovate.—Much-branched perennials, with densely canescent or setose branchlets. Stem-leaves alternate. Flowers small, in terminal bracteate scorpioid cymes.

Species 3–4, reaching through Western Asia to Scind.

Leaves linear, 1 lin. wide, or less	1. *S. albidum.*
Leaves oblanceolate, $1\frac{1}{2}$–3 lin. wide	2. *S. verrucosum.*

1. **S. albidum,** *Franch. Sert. Somali*, 46. A much-branched perennial with short branchlets, and leaves densely clothed with adpressed, whitish bristles. Leaves ascending, sessile, linear, with revolute edges, 3–6 lin. long. Cymes about 2 in. long; pedicels very short. Calyx very setose, about $1\frac{1}{2}$ lin. long; tube short; lobes linear-oblong. Corolla-limb $1\frac{1}{2}$ lin. in diam. Nuts small, ovoid.

Nile Land. Somaliland: Adda Galla and Lafarug, *James & Thrupp!* and without precise locality, *Révoil.*

2. **S. verrucosum,** *Beck in Paulits. Harar.* 457, *Bot. t.* 12, *figs.* 3–6. A small much-branched shrub, with densely leafy branches, clothed with adpressed bristly hairs. Leaves sessile, oblanceolate, cuspidate, narrowed gradually to the base, 3–4 lin. long, hispid on both sides. Cymes lax, scorpioid, terminal, 2–3 in. long; bracts linear, shorter than the calyx. Calyx half as long as the corolla, cut down nearly to the base; lobes linear, obtuse, hispid. Corolla 2 lin. long, blue or lilac, pilose outside, villous within; tube broadly funnel-shaped, densely hairy at the throat inside; lobes suborbicular. Nuts ovoid-triquetrous, acuminate, verrucose.

Nile Land. British Somaliland: Warabod, *Hardegger & Paulitschke.*

13. **MYOSOTIS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 858.

Calyx 5-lobed, but little accrescent; lobes narrow. Corolla hypocrateriform; tube straight, short, cylindrical, without scales at the throat; lobes 5, orbicular, patent, contorted. Stamens included in the corolla-tube; filaments very short; anthers oblong, obtuse or apiculate. Ovary with 4 distinct lobes inserted on the narrow gynobase; style filiform; stigma entire or 2-lobed; ovules erect. Nutlets 4, ovoid, erect, bony. Seeds straight; cotyledons ovate.—Annual or perennial herbs. Stem-leaves alternate. Racemes scorpioid, usually ebracteate. Flowers usually blue.

Species about 40, chiefly dispersed through the temperate regions of the Old World.

Racemes not bracteate	1. *M. sylvatica.*
Racemes bracteate.	
Corolla white	2. *M. abyssinica.*
Corolla bright blue	3. *M. æquinoctialis.*

1. **M. sylvatica,** *Hoffm. Deutsch. Fl. ed.* i. 85. Biennial. Stems slender, 1–2 ft. long, thinly clothed with short spreading bristly hairs. Upper stem-leaves sessile, ovate or oblong-lanceolate; lower obtuse, narrowed gradually to a short petiole. Racemes long, lax, ebracteate; lower pedicels much longer than the calyx. Calyx 2 lin. long; lobes lanceolate; tube short, with many short spreading bristly hairs. Corolla-tube as long as the calyx; limb bright blue, 2 lin. in diam. Nuts ovate, obscurely bordered.—DC. Prodr. x. 107; Reichb. Ic. Fl. Germ. t. 1322; A. Rich. Tent. Pl. Abyss. ii. 89; Engl. Hochgebirgsfl. Trop. Afr. 354; C. H. Wright in Dyer, Fl. Cap. iv. ii. 19. *M. arvensis,*

var. *sylvatica*, Pers. Syn. i. 156. *M. graminifolia*, var. *trinervia*, A. DC. in DC. Prodr. x. 110.

Upper Guinea. Cameroons: Cameroon Mountain, upper slopes, 8000 ft., *Johnston*, 72!

Nile Land. Abyssinia: Demerki, *Schimper*, 1152! and without precise locality, *Schimper*, 647!

Also in Europe, Western Asia, the Canary Islands, and South Africa.

2. **M. abyssinica,** *Boiss. et Reut. Diagn.* xi. 122. Annual. Stems short, clothed with short spreading bristly hairs. Upper leaves sessile, oblong or oblong-lanceolate; lower obtuse, narrowed to a short petiole. Racemes short, bracteate at the base; lower pedicels shorter than the calyx. Calyx 1½ lin. long; tube campanulate, as long as the lanceolate lobes, clothed with spreading bristly hairs, open in the fruiting stage. Corolla-tube as long as the calyx; limb white, 1 lin. in diam. Nutlets black, shining.—Engl. Hochgebirgsfl. Trop. Afr. 354. *M. hispida*, var. *bracteata*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 88; Schweinf. Beitr. Fl. Aethiop. 116. *M. stricta*, Hook. f. in Journ. Linn. Soc. vii. 207, not of Link.

Upper Guinea. Cameroons: Cameroon Mountain, 8000–10,000 ft., *Mann*, 2033! Fernando Po, 8000 ft., *Mann*, 1459!

Nile Land. Abyssinia: Demerki, *Schimper*, 1146! Mount Sholoda, near Adowa, *Schimper*, 1889! Shoa, *Petit!* Wojerat, *Petit!* Ankober, *Roth*, 159 (442)!

Mozamb. Dist. German East Africa: Kilimanjaro; at the foot of Kifinika Volcano, 8800 ft., *Volkens*, 1341!

3. **M. æquinoctialis,** *Baker in Kew Bulletin*, 1894, 29. Annual. Stems much branched, ½ ft. long, densely clothed with short spreading hairs. Stem-leaves sessile, lanceolate or oblong-lanceolate; lower obtuse, narrowed gradually to the base. Racemes bracteate at the base, finally 1½–2 in. long; pedicels very short, ascending. Calyx densely pilose outside, divided nearly to the base, finally 2 lin. long; lobes broadly lanceolate. Corolla-tube cylindrical, as long as the calyx; limb bright blue, 1 lin. in diam.; lobes shortly ovate. Nutlets black, glossy, smooth, lenticular, ¾ lin. long.

Mozamb. Dist. German East Africa: Kilimanjaro; by the side of streams, 13,200 ft., *Johnston*, 123!

14. **LITHOSPERMUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 860.

Calyx deeply 5-lobed, little accrescent; lobes narrow. Calyx-tube straight, subcylindrical; throat not closed by scales; lobes 5, orbicular, imbricate. Stamens 5, inserted in the corolla-tube; filaments very short; anthers oblong, obtuse or apiculate. Ovary with 4 distinct lobes, inserted on the narrow gynobase; style filiform; stigma usually terminal, 2-lobed; ovules erect. Nuts 4, ovoid, smooth or rugose, erect. Seeds straight; cotyledons flat.—Annual or perennial herbs.

Stem-leaves alternate. Flowers white, yellow or blue, arranged in bracteate scorpioid cymes.

Species 40, widely dispersed, mainly in the temperate regions of both hemispheres.

Annual; branches with adpressed hairs . . .	1. *L. arvense.*
Perennial; branches with patent hairs . . .	2. *L. officinale.*

1. **L. arvense,** *Linn. Sp. Pl. ed.* i. 132. Annual. Stems 1–2 ft. long, clothed with short adpressed hairs. Stem-leaves ascending, the upper sessile, linear, acute, the lower lanceolate, obtuse, subpetiolate. Cymes long, bracteate. Calyx in flower 3 lin., in fruit 4–6 lin. long; tube very short; lobes lanceolate. Corolla white; tube as long as the calyx; limb $\frac{1}{2}$ lin. in diam. Nutlets ovoid, drab, stony, rugose, glabrous.—Fl. Dan. t. 456; DC. Prodr. x. 74; Schweinf. Beitr. Fl. Aethiop. 116; Hook. f. Fl. Brit. Ind. iv. 174; C. H. Wright in Dyer, Fl. Cap. iv. II. 24.

Nile Land. Abyssinia: near Merosowa, 4000 ft., *Schimper.*

Also in Europe, Asia, and South Africa.

2. **L. officinale,** *Linn. Sp. Pl. ed.* i. 132. Perennial. Stems 2–3 ft. long, erect, densely hairy, simple or branched. Leaves many, oblong or oblong-lanceolate, subsessile, covered above with short bristly bulbous-based hairs, slightly pubescent beneath. Cymes long, copiously bracteate. Calyx in flower $1\frac{1}{2}$ lin. long, finally 3–4 lin.; tube very short; lobes linear, acute. Corolla scarcely longer than the calyx; hairy outside, yellowish-white; lobes rounded. Nutlets ovoid, pearly white, bony, $1\frac{1}{2}$ lin. long.—DC. Prodr. x. 76; C. H. Wright in Dyer, Fl. Cap. iv. ii. 23; var. *abyssinicum,* Engl. Hochgebirgsfl. Trop. Afr. 355.

Nile Land. Abyssinia: Begemeder; Mount Guna, 10,800 ft., *Schimper,* 1420! Somak Efat, *Roth,* 132 (434)! Ankober, *Roth,* 156 (433)! British East Africa: 2 days' march from Eldama Ravine, *Whyte!*

Mozamb. Dist. German East Africa: at Abori on Lake Victoria, *Fischer,* 435; Kinga Mountains, 8000 ft., *Goetze,* 944; Kilimanjaro, 8800 ft., *Volkens,* 947!

Widely spread all round the North temperate zone, and extending to South Africa.

15. **LOBOSTEMON,** Lehm.; Benth. et Hook. f. Gen. Pl. ii. 863.

Calyx 5-partite, not accrescent; segments linear or lanceolate. Corolla-tube funnel-shaped or subcylindrical, not scaled at the throat; limb slightly irregular; lobes suborbicular. Stamens inserted in the corolla-tube, unequal; filaments filiform; anthers small, suborbicular, or oblong. Ovary with 4 distinct lobes inserted on the narrow gynobase; style filiform; stigma small, subcapitate or emarginate; ovules erect. Nuts 4, erect, ovoid, rugose. Seed straight.—Perennial herbs or shrubs. Stem-leaves alternate, usually hispid. Flowers blue or

white, arranged in scorpioid spikes or racemes.—*Leurocline*, S. Moore in Journ. Bot. 1901, 257.

Species about 50; all the others in South Africa.

Flowers pale yellow . . . . . 1. *L. somalensis.*
Flowers blue.
  Flowers in a small dense terminal head . . . 2. *L. cryptocephalum.*
  Flowers solitary in the axils of the upper leaves . 3. *L. lithospermoides.*

1. **L. somalensis,** *Franchet, Sert. Somal.* 44. Shrubby at the base, but little branched. Branchlets glabrous, glaucescent. Stem-leaves small, ovate-lanceolate, obtuse, with verrucose dots over the upper surface. Racemes lax, bracteate; pedicels very short. Calyx-lobes unequal, obtuse, 2 smaller, linear. Corolla pale yellow when dried; tube slender, twice as long as the calyx; limb obliquely truncate. Stamens included. Nutlets trigonous, acutely tubercled.—*Leurocline somalense*, S. Moore in Journ. Bot. 1901, 258.

Nile Land. Somaliland, *Révoil.*

2. **L. cryptocephalum,** *Baker in Kew Bulletin*, 1894, 30. Perennial herb. Stem erect, simple, hairy, 1ft. long, regularly leafy up to the top. Leaves sessile, linear-oblong, entire, hispid on both sides, the central ones 1 in. long, the upper and lower smaller. Flowers in a small dense terminal head hidden by the ascending upper leaves. Calyx hispid, 3 lin. long; lobes lanceolate. Corolla bright blue; tube half as long again as the calyx, hairy at the throat; limb under 3 lin. in diam.; lobes suborbicular, rather unequal. Stamens not exserted from the corolla-tube.

Mozamb. Dist. British Central Africa: Urungu; Fwambo, *Carson*, 59!

3. **L. lithospermoides,** *Baker.* Stem branched, reaching nearly 1 ft. in height. Branches erect, slender, glabrous. Leaves sessile, ascending, lanceolate, 6–9 lin. long, glabrous on the upper surface, clothed with strong hairs on the edge and beneath and furnished with white dots near the base. Flowers blue, solitary in the axils of the upper leaves. Calyx 4 lin. long; sepals lanceolate, hispid on the edge, the posticous smaller than the others. Corolla blue; tube cylindrical, glabrous or slightly pruinose outside, villous in the upper part inside, dilated at the throat, twice as long as the calyx; limb 3–4 lin. in diam.; lobes orbicular. Filaments very short, the posticous inserted higher than the rest; anthers oblong. Style bifid at the apex, not exserted from the corolla-tube. Nutlets ovate, obtuse, reddish, a line long.—*Leurocline lithospermoides*, S. Moore in Journ. Bot. 1901, 257, t. 424, fig. A.

Nile Land. British East Africa: Leikipia, *Gregory;* Gof, 3900 ft., and between Le' and Tocha, *Lord Delamere.*

16. **ECHINOCHILON,** Desf.; Benth. et Hook. f. Gen. Pl. ii. 852.

Calyx 5-partite; segments lanceolate, 1 very small or obsolete. Corolla-tube subcylindrical, curved; throat not closed by scales; limb

bilabiate, irregular; upper lip erect, obscurely 2-lobed; lower more spreading, 3-lobed. Stamens 5, included in the corolla-tube; filaments very short; anthers oblong. Ovary with 4 lobes attached to the conic gynobase; style filiform; stigma 2-lobed. Nuts 4, ovoid. Seed straight; cotyledons entire.—Hispid perennials, with many alternate stem-leaves. Flowers small blue, arranged in leafy scorpioid spikes.

Species 2, the other from Aden.

1. **E. fruticosum,** *Desf. Fl. Atlant.* i. 167, *t.* 47. A dwarf much-branched perennial, with stems and leaves densely clothed with white bristly hairs. Leaves alternate, lanceolate, 3–6 lin. long. Flowers sessile in the axils of the upper leaves, crowded towards the tip of the branchlets. Calyx-segments $1\frac{1}{2}$ lin. long. Corolla-tube as long as the calyx; limb bright blue, 2 lin. diam.—DC. Prodr. x. 27.

Nile Land. Nubia: coast region near Ras Rauai, *Schweinfurth*, 2107!

Also in North Africa and Syria.

17. **ECHIUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 863.

Calyx 5-partite; segments linear or lanceolate. Corolla-tube funnel-shaped, curved, the oblique throat not closed with scales; lobes 5, imbricate, orbicular, unequal. Stamens 5, unequally inserted below the middle of the corolla-tube; filaments filiform, often dilated at the base; anthers ovate or oblong, obtuse, small. Ovary with 4 distinct lobes inserted on the narrow gynobase; style filiform, bifid at the apex; stigmas small. Nuts 4, distinct, erect, ovoid, rugose. Seeds erect; cotyledons flat.—Herbs or shrubs. Stem-leaves alternate. Spikes scorpioid, bracteate. Flowers usually blue or white.

Species 30–40, spread through Europe, North Africa, Western Asia, and several shrubby types in the Canaries and Azores.

Bristles spreading.	
Corolla half as long again as the calyx . . .	1. *E. Rauwolfii.*
Corolla twice as long as the calyx . . .	2. *E. longiflorum.*
Bristles ascending	3. *E. arenarium.*

1. **E. Rauwolfii,** *Delile, Fl. Égypte,* 195, *t.* 19, *fig.* 3. Annual, with a slender root, which stains purple. Stem erect, much branched, with copious spreading bristles. Stem-leaves sessile, linear-oblong, small, with copious white bulbous-based bristles; radical leaves oblanceolate, obtuse, 4–6 in. long, narrowed gradually into a short petiole. Spikes finally 6 in. or more long; bracts lanceolate, hispid. Calyx very hispid, 4–6 lin. long; segments lanceolate. Corolla pallid, half as long again as the calyx. Stamens reaching to the tip of the corolla-lobes. Nuts smooth, shining, $1\frac{1}{2}$ lin. long.—DC. Prodr. x. 23.

Nile Land. Soudan: between Berber and Khartoum, *Schweinfurth*, 541! Getena, *Schweinfurth*, 911! region of Khartoum, *Speke & Grant! Kotschy*, 264! 318! *Broun*, 36! *Petherick! Bromfield!* Blue Nile, *Muriel*, 44! near Wolet Medine (Wold Medineh), *Kotschy*, 464!

Also in North Africa and Western Asia.

2. **E. longifolium,** *Delile, Fl. Égypte,* 184, *t.* 16, *fig.* 3. Annual, with slender root. Stems branched, with copious spreading bristles. Stem-leaves small, sessile, linear-oblong; radical-leaves oblanceolate, obtuse, narrowed into a short petiole. Spikes many, lax; bracts lanceolate, 4–6 lin. long. Calyx very bristly, 4 lin. long; segments lanceolate. Corolla bright blue, twice as long as the calyx; lobes small, orbicular. Stamens reaching to the tip of the corolla-lobes. Nuts ovoid, 2 lin. long, rugose on the outer face.—DC. Prodr. x. 23. Schweinf. Beitr. Fl. Aethiop. 115.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth,* 2063! in Wadi Mahas, Wady Dongola and near El Korehr, *Ehrenberg* ex *Schweinfurth.*

Also in Egypt.

3. **E. arenarium,** *Guss. Ind. Hort. Boccad.* 1825 *and Pl. Rar.* 88, *t.* 17. Annual or biennial. Stems short, diffuse, clothed with short ascending bristles. Leaves all obtuse, oblanceolate. Spikes lax, elongate; bracts large, ovate-lanceolate. Calyx very hispid, 3 lin. long, but little accrescent; tube short; teeth lanceolate. Corolla bright blue, 4–6 lin. long. Stamens comparatively short. Nuts ovoid, acute, strongly tubercled.—DC. Prodr. x. 21; Schweinf. Beitr. Fl. Aethiop. 115.

Nile Land. Sennar: near Wolet Medene (Wold Medineh), and near Roseires, *Cienkowsky* ex *Schweinfurth.*

Also in South Europe, North Africa, and Western Asia.

ORDER XC. CONVOLVULACEÆ. (By J. G. Baker and A. B. Rendle.)

Flowers hermaphrodite (very rarely unisexual), regular (very rarely slightly zygomorphic). Calyx inferior; sepals 5 (very rarely 4), free (rarely united at the base), much imbricate, equal or more or less unequal, often, especially the outer, accrescent. Corolla gamopetalous, usually funnel-shaped, sometimes more or less campanulate, or hypocrateriform, rarely urceolate; limb subentire or 5-lobed, or deeply 5-partite (very rarely 4-partite), in bud generally induplicate-valvate, often contorted, glabrous inside, frequently more or less definitely marked on the outside into more or less hairy and veined midpetaline areas, which are outside in the bud, separated by glabrous episepaline areas. Stamens 5 (very rarely 4), inserted low down in the corolla-tube, opposite the sepals; filaments equal or unequal, filiform, generally dilated and glandular hairy at the base, rarely stipulate, rarely attached to scales; anthers introrse, oblong, often more or less sagittate at the base. Pollen spherical and spinose all over, or spherical and smooth, or ellipsoidal and marked with longitudinal or other folds. Hypogynous disc annular or cup-shaped, often shallowly 5-lobed, sometimes obsolete. Ovary superior, entire, of 2 (rarely 3) united carpels, 2- (rarely 3-) celled, sometimes 1-celled, or by

development of spurious septa 4-celled, rarely 2- or 4-partite; style filiform, simple, or more or less deeply bifid, or styles 2; stigma terminal and entire or bilobed, or stigmas 2 (rarely 4), globose, ellipsoid, filiform, or flattened and elliptical or linear, rarely peltate and irregularly palmatilobed; ovules 2 in each carpel, rarely solitary, erect, anatropous, sessile. Fruit girt, or more or less enveloped, by the persistent calyx, 1–3-celled, or spuriously 4-celled, generally a capsule dehiscing by valves, more rarely transversely or irregularly, sometimes indehiscent, with membranous, leathery, woody or fleshy pericarp. Seeds 4–1, becoming triquetrous on the inner face by mutual pressure, convex on the back, glabrous, or hairy especially on the angles, sometimes verrucose. Embryo straight; radicle pointing towards the hilum; cotyledons foliaceous, generally folded with emarginate or broadly bilobed apex; endosperm copious, cartilaginous.—Annual or perennial herbs, undershrubs or shrubs, often climbing, sometimes glabrous, often more or less hairy. Leafless parasites in *Cuscuta*. Leaves alternate, exstipulate, entire or often palmately divided, more rarely pinnate, base often cordate. Flowers generally axillary, solitary or cymose, often aggregated into heads, rarely paniculate or approximated in a terminal spike. Bracts various, generally small and narrow, sometimes larger and more or less foliaceous; rarely persistent in the fruit. Flowers minute to large, often very showy.

Species more than 1000, cosmopolitan, but much more numerous in the tropics.

I. Non-parasitic plants with developed green leaves.

A. Pollen grains smooth.

Tribe I. **Dichondreæ.**—*Flowers small, axillary, solitary. Sepals free or united at the base, silky outside, obsolete in* Nephrophyllum. *Corolla funnel-shaped or broadly campanulate. Stamens and styles included; filaments short, naked. Ovary bifid or 4-lobed, and 4-ovuled, or entire,* 1*-celled and 2-ovuled. Styles* 2*, gynobasic or terminal. Fruits indehiscent,* 1*-seeded.—Prostrate or creeping herbs with stalked reniform or oblong leaves.*

*Calyx developed.
- Ovary 2-fid . . . . . 1. Dichondra.
- Ovary 4-lobed . . . . . 2. Falkia.

**Calyx obsolete . . . . . 3. Nephrophyllum.

Tribe II.—**Dicranostyleæ.**—*Flowers small, axillary, solitary or in few- to many-flowered axillary dichasia. Sepals free, sometimes accrescent. Corolla funnel-shaped to campanulate; æstivation contorto-plicate. Ovary usually* 2*-celled,* 4*-ovuled. Styles* 2 *or single and bifid. Fruit a capsule with generally valvular dehiscence,* 1*–*4*-seeded.—Herbs or shrubs; stems prostrate erect or climbing.*

*Sepals not accrescent.
- Styles 2, forked . . . . . 4. Evolvulus.
- Styles not forked.
  - Stamens and style exserted . . . . 7. Cressa.
  - Stamens and style not exserted.
    - Small shrubs with prostrate or suberect branches . . . . . 8. Seddera.
    - Shrubby climbers . . . . . 9. Bonamia.

**Sepals accrescent (plants diœcious).

2 outer sepals much longer than the inner . . 5. HILDEBRANDTIA.
All the sepals accrescent . . . . . 6. CLADOSTIGMA.

TRIBE III. **Poraneæ.**—*Flowers generally small and racemose or panicled (in sessile or subsessile axillary cymes in* Prevostea). *Bracts or sepals accrescent. Corolla various. Stamens generally included. Styles* 2 *or single and bifid. Fruit one-seeded.—Climbing shrubs.*

*Bracts accrescent . . . . . 10. NEUROPELTIS.
**2 outer sepals accrescent.
Style unequally bifid, rarely divided to the middle; stigmas ellipsoid to globose . . . . 11. PREVOSTEA.
Style deeply bifid; stigmas linear-oblong . . 12. DIPTEROPELTIS.
***Sepals not accrescent . . . . . 13. PORANA.

TRIBE IV. **Convolvuleæ.**—*Flowers axillary, solitary or dichasial. Sepals free, rarely accrescent. Corolla funnel-shaped, subentire; midpetaline areas not well defined; æstivation contorto-plicate. Stamens and style included. Filaments dilated at the base and glandular hairy. Ovary* 2*-celled,* 4*-ovuled. Style long, entire. Fruit a valvate capsule,* 2*-celled,* 4*-seeded, rarely with opercular or irregular dehiscence or indehiscent.*

*Flower subtended by a pair of large foliaceous bracts 17. CALYSTEGIA.
*Flowers not thus subtended.
†Outer sepals not conspicuously larger than the inner.
Stigmas elliptic . . . . 14. JACQUEMONTIA.
Stigmas filiform . . . . 16. CONVOLVULUS.
Stigma biglobular.
Capsule dehiscent, several seeded . . 19. MERREMIA.
Capsule indehiscent, 1-seeded . . . 20. HYALOCYSTIS.
††Outer sepals conspicuously larger than the inner.
Stigma biglobular . . . . . 15. ANISEIA.
Stigmas ovate-oblong . . . . . 18. HEWITTIA.

B. Pollen grains spinose.

TRIBE V. **Ipomœeæ.**—*Flowers axillary, solitary or in few- to many-flowered cymes, often large and showy. Sepals sometimes much enlarged in fruit. Corolla generally funnel-shaped, sometimes more or less campanulate, hypocrateriform or urceolate* (Lepistemon); *midpetaline areas well defined; æstivation contorto-plicate. Stamens and styles included, or sometimes exserted. Filaments with dilated glandular-hairy base. Ovary generally* 2*-celled and* 4*-ovuled. Style simple; stigma capitate, entire or bilobed, rarely oblong. Fruit generally a* 4*-valved capsule.—Habit various.*

*Stamens springing from the base of 5 scales.
Corolla urceolate . . . . . 21. LEPISTEMON.
Corolla campanulate . . . . . 22. LEPISTEMONOPSIS.
**Stamens not attached to scales.
Pedicel accrescent . . . . . 23. CALONYCTION.
Pedicel not accrescent.
Plants stellately hairy . . . . . 24. ASTROCHLÆNA.
Plants not stellately hairy.
Corolla hypocrateriform, scarlet; genitalia exserted; ovary 4-celled . . . 25. QUAMOCLIT.
Four above characters not associated . . 26. IPOMŒA.

TRIBE VI. **Argyreieæ.**—*As in* Ipomœeæ, *but fruit indehiscent, with fleshy or woody pericarp.*

Only Tropical African genus . . . . . 27. ARGYREIA.

II. Parasitic plants with filiform leafless stems.

TRIBE VII. **Cuscuteæ.**—Characters of the section.

Only Tropical African genus . . . . . 28. CUSCUTA.

1. DICHONDRA, Forst.; Benth. et Hook. f. Gen. Pl. ii. 879.

Sepals subequal, oblong-spathulate, rather accrescent. Corolla broadly campanulate, not longer than the calyx; lobes 5, induplicate-valvate. Stamens short, inserted in the corolla-tube; filaments filiform; anthers oblong. Ovary 2-lobed, each lobe 2-ovuled; styles 2, gynobasic, short, filiform; stigmas capitate. Capsule 2-lobed; lobes subglobose, membranous, indehiscent, 1-seeded. Seed subglobose, smooth; cotyledons linear-oblong, plicate.—Creeping perennial herbs, with slender stems. Leaves petioled, cordate-reniform. Flowers minute, axillary, peduncled, single.

Species 4–5, cosmopolitan, principally American.

1. **D. repens,** *Forst. Gen.* 40, *t.* 20. A perennial herb with slender trailing pubescent stems rooting from the nodes. Leaves reniform, $\frac{1}{4}$–1 in. broad, more or less silky especially on the lower face, long-petioled. Flowers axillary, solitary; peduncles shorter than the petiole. Calyx barely exceeding 1 lin. long; sepals oblong to oblong-spathulate, pilose on the back and edges. Corolla yellow, slightly shorter than the calyx, deeply 5-fid; lobes elliptic-oblong. Utricles of fruit about 1 lin. broad; seed brown, glabrous.—Choisy in DC. Prodr. ix. 451; Hallier f. in Engl. Jahrb. xviii. 82, and in Ann. Istit. Bot. Roma, vii. 223; Hiern in Cat. Afr. Pl. Welw. i. 723 (var. *sericea*, not of Choisy); Baker & Wright in Dyer, Fl. Cap. iv. ii. 83.

Nile Land. Somaliland? *Riva*, 1249. Uganda: Kavirondo, *Scott-Elliot*, 7062! *Whyte!* between Eldama Ravine and Mau Plateau, 7000–8000 ft., *Whyte!*

Lower Guinea. Angola: Bumbo, *Welwitsch*, 626!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, *Volkens*, 686.

Also in South Africa, Socotra, Mascarene Islands, St. Helena, and widely spread in Asia, Australia, and America.

2. FALKIA, Linn. f.; Benth. et Hook. f. Gen. Pl. ii. 878.

Sepals subequal, broad, joined at the base. Corolla small, broadly funnel-shaped, plicate, 5-angled, slightly lobed. Stamens inserted low down in the corolla-tube, not exserted; filaments filiform; anthers oblong. Ovary 4-lobed, 4-ovuled; styles 2, gynobasic, filiform; stigmas capitate. Fruit of 4 membranous utricles. Seeds solitary, ovoid or globose; testa crustaceous; embryo plicate, with broad cotyledons.—Prostrate perennial herbs with cordate-orbicular to oblong leaves and small solitary peduncled axillary flowers.

Species 3, all South African.

1. **F. oblonga,** *Bernh. var.* **minor,** *C. H. Wright in Dyer, Fl. Cap.* iv. ii. 82. Rootstock horizontal, sending out short few-leaved branches

above ground. Leaves petioled, orbicular or ovate, 3–6 lin. long, silky when young, glabrescent when mature. Flowers solitary, axillary; pedicels 1½–2 lin. long. Calyx 2 lin. long; tube turbinate; lobes small, deltoid. Corolla 4–6 lin. long. and broad. Filaments 3 lin. long. Ovary densely pilose; styles 4 lin. long.—*F. abyssinica*, Engl. Hochgebirgsfl. Trop. Afr. 344; Hallier f. in Engl. Jahrb. xviii. 84; Capua in Ann. Istit. Bot. Roma, viii. 219. *F. oblonga*, Hallier f. in Bull. Herb. Boiss. vii. 41 in part, and Capua l.c.

Nile Land. Eritrea: Asmara, *Schweinfurth & Riva*, 2096! Assaorta, *Pappi*, 3467; Hamasen, *Terraciano & Pappi*, 218; Oculè Cuzai, *Pappi*, 4390. Abyssinia: mountains near Magdala, *Steudner*, 958!

Also in South Africa.

3. **NEPHROPHYLLUM**, A. Rich.; Benth. et Hook. f. Gen. Pl. ii. 876.

Calyx membranous, nearly obsolete. Corolla funnel-shaped, 5-angled, obscurely lobed. Stamens unequal, inserted low down in the corolla-tube; filaments filiform; anthers oblong. Disc inconspicuous. Ovary 1-celled, 2-ovuled; styles 2, simple, filiform; stigmas capitate. Fruit thrust beneath the soil by the elongating pedicel, indehiscent, 1-seeded. Seed subglobose, glabrous; cotyledons very narrow.—A perennial herb, with the habit of *Dichondra*. Leaves small, petioled, reniform. Flowers solitary, sessile in the axils of the leaves.—*Hygrocharis*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 77.

Endemic.

1. **N. abyssinicum,** *A. Rich. Tent. Fl. Abyss.* ii. 77, *t.* 76. A creeping tufted perennial herb, with very slender stems rooting from the nodes. Leaves reniform, glabrous, 2½–5 lin. in diam. Petiole as long as or longer than the blade; bracteoles membranous, elliptic-ovate, obtuse, ¾ lin. long. Peduncle reaching an inch long in fruit. Corolla 2½ lin. long. Fruit about 1½ lin. in diam., ellipsoid.—Engl. Hochgebirgsfl. Trop. Afr. 345. *Hygrocharis abyssinica*, Hochst. ex A. Rich. l.c.; Hallier f. in Engl. Jahrb. xviii. 81.

Nile Land. Abyssinia: mountain meadow near Enjedcap, *Schimper*, 572! near Jelajeranne, *Schimper*, 1701! Debra Tabor, 8500 ft., *Schimper*, 1142! near Adowa, *Dillon*.

4. **EVOLVULUS,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 875.

Sepals subequal, acute or obtuse. Corolla blue or white, funnel-shaped or subrotate; limb 5-angled, sometimes 5-lobed. Stamens inserted about the middle of the corolla-tube; filaments filiform, glabrous; anthers oblong; pollen spherical. Ovary 2-celled, rarely 1-celled, 4-ovuled; styles 2, distinct from the base, forked; stigmas long, subterete. Capsule subglobose, 2–4-valved, 1–2-celled. Seeds 2–4, glabrous; cotyledons nearly flat.—Annual or perennial herbs,

rarely shrubby, never twining. Leaves simple, usually entire. Flowers small, in few-flowered axillary dichasia or aggregated in spikes at the end of the branches.

Species, about 70, nearly all Tropical American.

Capsule 2-celled.	Corolla shallowly lobed . . .	1. *E. alsinoides.*
Capsule 1-celled.	Corolla deeply lobed . . .	2. *E. nummularius.*

1. **E. alsinoides,** *Linn. Sp. Pl. ed.* 2, 392. Annual or perennial. Stems tufted, slender, hairy, spreading or ascending. Leaves elliptic, oblanceolate-oblong to lanceolate, $\frac{1}{2}$–1 in. long, hairy on both surfaces, generally narrowed to the base, apex obtuse (often mucronate) to acute. Peduncles slender, hairy, 1–3-flowered, shorter than, equal to or longer than the leaves, often 1–$1\frac{1}{2}$ in. long; pedicels short; bracts lanceolate, minute. Sepals lanceolate to lanceolate-ovate, acute, hairy, $1\frac{1}{2}$–2 lin. long. Corolla broadly funnel-shaped, a little longer than the calyx, usually bright blue, rarely white, 3 lin. in diam. when expanded. Capsule globose, 4-valved, $1\frac{1}{2}$ lin. in diam.—Seeds 4, brown, or black, glabrous.—Choisy in DC. Prodr. ix. 447; Benth. in Hook. Niger Fl. 470; Klotzsch in Peters, Reise Mossamb. Bot. 246 (var. *strictus*): Schweinfurth, Beitr. Fl. Aethiop. 93 (incl. vars.); Oliver in Trans. Linn. Soc. xxix. 117; Hallier f. in Engl. Jahrb. xviii. 85; Hiern in Cat. Afr. Pl. Welw. i. 724; Dammer in Engl. Pfl. Ost.-Afr. C. 328 (incl. varieties); Capua in Ann. Istit. Bot. Roma, viii. 222 (incl. varieties). *E. fugacissimus*, Hochst. in Schimp. Pl. Abyss. No. 828; A. Rich. Tent. Fl. Abyss. ii. 75. *E. linifolius*, Linn. l.c.; Choisy l.c. 449; Franchet, Sert. Somal. 43. *E. azureus*, Schum. & Thonn. Beskr. Guin. Pl. 166.

Upper Guinea. Senegal: *Roger*, 12! *Heudelot*, 229! *Perrottet*, 504! Gold Coast: Accra, *Don! Vogel! Ansell! Brown*, 360! Salaga, *Krause!* Togo, *Warnecke*, 212! Lagos, *Migeod! Rowland.* Northern Nigeria, *Vogel*, 159! *Barter*, 546! Bornu: Mora, *Vogel!*

Nile Land. Throughout the region from Nubia to Mombasa, *Kotschy*, 371! *Bent! Lord! Cienkowski, Pfund*, 135! 514! *Kotschy*, 411! 412! *Schweinfurth & Riva! Pappi, Terraciano, Ragazzi, Steudner*, 957! *Ehrenberg, Petit*, 297! *Schimper*, 359! 828! 1150. *Hildebrandt*, 529! 1528! *Mrs. Lort Phillips! Miss Edith Cole! Révoil, Riva*, 1271, 1471, *Schweinfurth*, 7! 4269! *Freeman & Lucas! Donaldson Smith! Wellby! Bagshaw*, 318! *Scott-Elliot*, 6109! 7380! 7444! *Speke & Grant*, 538! *Whyte! Kässner*, 534! *Johnston! Taylor! Wakefield!*

Lower Guinea. Lower Congo, *Hens*, 17, A 311! Loango, *Soyaux.* Angola, *Welwitsch*, 6155! 6156! 6161! 6162! 6255! *Gossweiler*, 225! *Baum*, 510. Damaraland, *Een!* Amboland, *Schinz*, 746.

South Central. Congo Free State: Mtowa, *Descamps.* Angola: upper part of Ninda River, *Serpa Pinto.*

Mozamb. Dist. German East Africa, *Hannington! Wilson*, 28! *Fischer*, 415! *Holst*, 2595! *Volkens*, 2182! Portuguese East Africa: Tete and Lupata, *Kirk!* British Central Africa: Nyasaland, *Simons! Buchanan!* Matabeleland, *Oates! Elliott! Mrs. Evelyn Cecil*, 116! *Rand*, 127! Ngamiland, *Lugard*, 141! *Miss Lugard*, 99!

A very variable plant, varying from spreading to erect in habit, and also in the

shape of the leaf, relative length of the peduncle and general hairiness. Schweinfurth (followed by Hallier and Hiern) recognises two varieties, *procumbens* (*E. alsinoides*, Linn.) and *erectus* (*E. linifolius*, Linn.), but, as I find it impossible to say to which form many of the specimens belong, I prefer to consider them all under the species. Some specimens credited to var. *erectus* are young plants, which perhaps become procumbent later. *A. B. R.*

Also in South Africa, and widely distributed in the Tropics.

2. **E. nummularius,** *Linn. Sp. Pl. ed.* 2, 391. A perennial herb, with the habit of *Dichondra repens;* stems shortly hairy, trailing, $\frac{1}{2}$–1 ft. long, rooting from the nodes. Leaves orbicular or orbicular-obovate or elliptic, apex very obtuse, truncate or retuse, about 6 lin. long and broad; petiole very short. Flowers few, solitary in the axils of the leaves, on very short recurving peduncles. Sepals ovate to elliptic-ovate, subacute, pubescent or nearly glabrous, with ciliate margins, about $1\frac{1}{4}$ lin. long. Corolla white, subrotate, twice as long as the calyx, deeply lobed; lobes obovate. Capsule globose, $1\frac{1}{2}$ lin. in diam., 1-celled, 2-valved. Seeds 2–4, black or brown, shining.—Choisy in DC. Prodr. ix. 445; Hallier f. in Engl. Jahrb. xviii. 85; Hiern in Cat. Afr Pl. Welw. i. 723. *E. dichondroides,* Oliver in Trans. Linn. Soc. xxix. 117, t. 78B.

Nile Land. Upper Nile: *Freeman & Lucas!* Bongo: Lesi River, *Schweinfurth,* 4011! Uganda, *Speke & Grant,* 524! British East Africa: Sabaki Valley, *Gregory!*

Lower Guinea. Angola: Huilla; near Lopollo and by Lake Ivantala, *Welwitsch,* 6136!

Also in Tropical America.

5. **HILDEBRANDTIA**, Vatke; Benth. et Hook. f. Gen. Pl. ii. 1243.

Diœcious, flowers small, 4–5-merous. Sepals in the male flower subequal, in the female flower 2 or 3 outer much larger than the inner, accrescent. Corolla minute, several times longer than the calyx in the male flower, slightly protruding beyond it in the female, funnel-shaped, 4–5-lobed. Filaments glabrous; anthers oblong, exserted, aborted in the female flower. Ovary glabrous, 2-celled, 4-ovuled, smaller and sterile in the male; styles 2; stigmas somewhat horseshoe-shaped, with a pair of irregularly crenately lobed branches. Capsule concealed by the two large membranous, orbicular, veined, accrescent outer sepals, 4-valved, 2-celled. Seeds 1–4, trigonous, glabrous.—Much-branched shrubs; some branches elongated, spreading, erect, or climbing, others short and tuberculiform; leaves alternate along the young elongated shoots, or fascicled on the dwarf shoots, small, cuneate-spathulate, subsessile. Flowers axillary on the dwarf shoots, subsessile in the male, on slender stalks in the female.

Species 4; endemic.

Flowers tetramerous.

Inner pair of sepals of female flower minute, not accrescent.

Base of outer pair not decurrent on the peduncle .	1. *H. africana.*
Base of outer pair shortly decurrent on the peduncle	2. *H. obcordata.*
Inner pair of sepals of female flower, 1–1½ lin. long, accrescent	3. *H. sepalosa.*
Flowers pentamerous	4. *H. somalensis.*

1. **H. africana,** *Vatke in Sitzungsb. Ges. Naturf. Fr. Berlin*, 1876, 8. A much-branched shrub, 6 ft. high, with terete brown spreading woody glabrescent branchlets, spinescent at the apex, the thin bark splitting in elongated areas. Leaves fascicled on pubescent dwarf shoots, oblanceolate- to obovate-spathulate, obtuse or emarginate, 3–6 lin. long, tapering below into the short petiole, with adpressed silky hairs on both surfaces, hairs attached in the middle. Flowers axillary, 1 to few in each dwarf branch, 4-merous. Male very shortly stalked, female on a slender silky pedicel, about 3 lin. long; bracteoles at the base of the stalk, very small, filiform, deciduous. Male flower : 2 outer sepals broadly ovate, blunt, a little over 1 lin. long, rather larger than the decussating inner pair, which are elliptic-oblong and shortly acute; corolla about 3 lin. long, deeply 4-fid, lobes elliptic-ovate, blunt; stamens ripening in pairs, filaments tapering gradually from base to apex, entire, glabrous; ovary rudiment bearing 2 slender tapering styles. Female flowers: 2 outer sepals large orbicular, entire, attached in the lower third to the pedicel, sparsely silky, becoming 8 to 9 lin. long in the fruit, inner sepals minute; corolla as in the male; stamens infertile, anthers represented by a flattened extension of the filament; styles 2, long, filiform, each bearing a large, somewhat horseshoe-shaped, fleshy, crispulate stigma. Capsule small, globose, 2½ lin. in diam., concealed between the thin membranous accrescent outer sepals. Seeds yellowish, 1½ lin. long. —Vatke in Monatsb. Akad. Berl. 1876, 864, Journ. Bot. 1876, 313, Bot. Zeit. 1876, 362, and Linnaea, xliii. 525; Hallier f. in Engl. Jahrb. xviii. 87, and xxv. 515.

Nile Land. Somaliland : Ahl Mountains near Maid, 3000–4000 ft,, *Hildebrandt*, 1525 ! 1534 ! Giacorsa, *Riva*, 457; and without precise locality, *Mrs. Lort Phillips !*

H. undulata, S. Moore in Journ. Bot. 1899, 406, t. 402, fig. B, differs from the type specimens in the almost glabrous character of the outer sepals in the female flower.

2. **H. obcordata,** *S. Moore in Journ. Bot.* 1899, 406, *t.* 402, *fig. A.* Branchlets woody, resembling those of *H. africana.* Leaves on pubescent dwarf-shoots, shortly petioled, obovate with emarginate apex, 6 lin. long or less, cuneate at the base, glabrous above, sparsely clothed with adpressed hairs beneath. Flowers unknown. Fruits solitary or in pairs; peduncles slender, 4–6 lin. long, 2 outer sepals suborbicular, about 9 lin. long and broad, base subacute, decurrent on the peduncle, reticulately veined, glabrous, united to the pedicel in the lower half, two inner minute. Capsule subglobose, 2½ lin. long, thinly crustaceous, 4-valved. Seeds 4, dark purple, scarcely 1½ lin. long.

Nile Land. Somaliland, *Donaldson Smith !*

3. **H. sepalosa,** *Rendle.* A shrub, apparently erect, with (in the single specimen seen) pseudo-dichotomous branching. Branchlets stiff, woody, ascending, covered with brownish-grey bark, splitting in longitudinal areas. Leaves fascicled on dwarf-shoots, cuneate-spathulate, 3–4 lin. long, apex emarginate, subsessile, sparsely pilose on lower surface and margin with the characteristic adpressed hairs. Flowers tetramerous. Male with subequal sepals about 1 lin. long, the two outer orbicular, the two inner slightly smaller and elliptic, blunt, pubescent on the back. Corolla funnel-shaped, a little over 3 lin. long, 4-fid to about the middle; lobes ovate, sparsely hairy in the median area on the back. Anthers oblong. Ovary rudimentary; styles exceeding the stamens, $2\frac{1}{2}$ lin. long; stigmas somewhat horseshoe-shaped, lobulate. Female flowers on filiform pedicels, 3 lin. long and sparsely hairy. 2 outer sepals, broadly elliptic, nearly 3 lin. long, apex rounded, base subacute, adnate to the pedicel in the lower third, sparsely pubescent on the back; 2 inner sepals elliptic, blunt, reaching to the margin of the outer, a little over 1 lin. to $1\frac{1}{2}$ lin. long. Corolla as in the male; staminodes filiform, glabrous; anthers aborted. Ovary subglobose; stigmas as in *H. africana.* Immature fruit, 4-seeded, semiglobose, enveloped in the larger membranous suborbicular outer pair of sepals, $3\frac{1}{2}$ lin. long, and the inner elliptic pair, 3 lin. long; base of outer sepals acutely decurrent on the pedicel.

Nile Land. Somaliland: Harradigit, *James & Thrupp!* British East Africa: between Ndi Mountain and the Tsavo River, *Hildebrandt*, 2600!

4. **H. somalensis,** *Engl. ex Peter in Engl. & Prantl, Pflanzenfam.* iv. 3A, 20. A woody climber with spreading lateral branches; the slender elongated climbing shoots brown; final branchlets short; the older rigid, with grey to blackish, longitudinally splitting bark. Leaves very small, subcoriaceous, 3–5 lin. long, 1 lin. or a little more broad, spathulate, obtuse with mucronulate apex, glabrescent, glaucescent. Female flowers few, fascicled on the leafy dwarf-shoots; bracteoles minute, filiform, silky like the short pedicels, which do not exceed $1\frac{1}{2}$ lin. long. Sepals unequal; 3 outer elliptic-ovate, obtuse, with subacute base, adnate to the pedicels nearly to the middle, about $2\frac{1}{2}$ lin. long, bearing a few of the characteristic adpressed hairs; 2 inner minute, ovate-lanceolate, acute. Corolla 2 lin. long, deeply 5-partite; lobes lanceolate. Staminodes slender, broadening slightly downwards, $\frac{2}{3}$ lin. long, glabrous, exstipulate; anthers aborted; ovary bluntly ovoid, glabrous. Styles $1\frac{1}{2}$ lin. long; stigmas somewhat horseshoe-shaped, irregularly lobulate.—Engl. Jahrb. xviii. 87; Hallier f. in Engl. Jahrb. xxv. 516.

Nile Land. Somaliland: Ahl Mountains near Maid, 3500 ft., *Hildebrandt*, 1538! Harar: Gildessa to Zeila, *Robecchi-Bricchetti*, 33.

6. **CLADOSTIGMA,** Radlk. in Abhandl. Naturw. Ver. Brem. viii. 412.

Flowers small, dicœcious, solitary or few in a subsessile umbel-like cyme. Sepals 5, obovate, subequal, accrescent, becoming membranous, veined

and spreading in the fruit. Corolla campanulate-funnel-shaped, exceeding the calyx in the male flowers; limb deeply 5-fid; segments obovate, induplicate-valvate. Staminal-filaments filiform, slightly dilated but not appendaged at the base; anthers oblong, aborted in the female. Disc broadly 5-lobed. Ovary 2-celled; ovules 2 in a cell. Styles 2, connate at the base; stigmas terminal, more or less hippocrepiform. Young fruit obovoid-globose, with a single seed in each cell.—Small-leaved shrubs with rigid branches.

Species 2, one of them also in Arabia.

Leaves ovate-elliptic, $2\frac{1}{2}$–5 lin. broad, on elongated shoots	1. *C. dioicum.*
Leaves narrower, about 2 lin. broad, on elongated and dwarf shoots	2. *C. hildebrandtioides.*

1. **C. dioicum,** *Radlk. in Abhandl. Naturw. Ver. Bremen,* viii. 412. A much-branched shrub with greyish bark; leafy branches slender, reaching 6–7 in. in length, bearing a dense yellowish-brown pubescence. Leaves ovate-elliptic, obtuse with shortly mucronate apex and rounded base, generally between 6–9 lin. long, $2\frac{1}{2}$–5 lin. broad, tomentose like the stem; petiole slender, tomentose, $1\frac{1}{2}$–2 lin. long. Flowers small, solitary or few in subsessile umbelliform axillary cymes. Bracts minute, linear, subacute, bearing, as do also the slender pedicels (about 3 lin. long), the characteristic pubescence. Sepals 5, subequal, obovate-elliptic, obtuse, barely $1\frac{1}{2}$ lin. long in the male flower, pubescent on the back, the two inner somewhat smaller and ovate; accrescent in fruit. Corolla shortly funnel-shaped, 3 lin. long, whitish ("lactea"), deeply 5-fid; lobes rather narrowly obovate, obtuse, midpetaline areas densely hairy. Stamens a little shorter than the corolla; filaments filiform, tapering, becoming broader, thickened and shortly hairy at the base; anthers oblong, $\frac{2}{3}$ lin. long, replaced in the female flower by flattened sterile structures. Ovary (small in the male) surrounded by a ring-like disc, glabrous except for a few scattered hairs at the apex. Styles connate at the base; stigmas hippocrepiform. Capsule globose, about $1\frac{1}{2}$ lin. in diam., glabrous, 2-celled; cells 1-seeded by abortion; pericarp thin, brittle; seeds (immature) black, glabrous.—Hallier f. in Engl. Jahrb. xviii. 87, and in Bull. Herb. Boiss. vii. 62. *Evolvulus Lavæ,* Schweinf. in Herb. Erythr. Nos. 647, 1606, et ex Penzig in Atti Congr. Bot. Geneva, 1892, 351; Deflers in Bull. Soc. Bot. Fr. xliii. 121; Capua in Ann. Istit. Bot. Roma, viii. 224. *Hippocrepistigma fruticosum,* Deflers, l.c.

Nile Land. Eritrea, between 1000 and 4000 ft.: Hababb, 3000 ft., *Hildebrandt,* 489! *Terracciano & Pappi,* 483, 506; Samhar, 1000 ft., *Terracciano & Pappi,* 2439, 2440; Mensa, 2000 ft., *Terracciano & Pappi,* 1708. Upper Lasa Valley, *Schweinfurth,* 1606; Damas Valley, *Schweinfurth & Riva,* 647! Aidereso, *Schweinfurth & Riva,* 1611; Haddas Valley, *Schweinfurth,* 473.

Also in Arabia.

2. **C. hildebrandtioides,** *Hallier f. in Ann. Istit. Bot. Roma,* vii. 224 (*name only*), *and in Bull. Herb. Boiss.* vii. 63. A dicœcious shrub, 3 to 10 ft. high, covered with silvery-grey forked hairs; branches

numerous, slender (1–1½ lin. thick), elongated, finally leafless and spinescent at the tip, ultimate branchlets shortened, tuberculiform. Leaves scattered on the elongated branches, fascicled on the dwarf shoots (2½–9 lin. long, about 2 lin. broad), very variable in form, narrowly oblong, oblong-lanceolate or obovate, obtuse or emarginate, base acute, tapering into the very short petiole, adpressed hairy on both surfaces. Flowers small, solitary, generally fascicled with the leaves on the dwarf shoots; pedicels slender, about equal to the flowers, bearing a pair of minute linear bracts near the base. Sepals subequal, thinly membranous, silvery-silky on the back, in the male about 1 lin. long, ovate and subobtuse, in the female obovate-spathulate, nearly equal to the corolla, 3 lin. long and nearly as broad; in the fruit rather rigid, spreading, longitudinally 5-nerved and transversely veined. Corolla campanulate, funnel-shaped, 3½ lin. long; lower part of tube subglobose, upper campanulate; lobes equal in length to the tube, elliptic-ovate, back silky, edges glabrous. Stamens shorter than the corolla, glabrous; filaments filiform, subulate, dilated gradually towards the base; anthers oblong, absent in the female. Disc in male flower thick, 5-lobed; sterile pistil cone-shaped, long-haired; styles as long as the stamens, each ending in a deeply cordate 5-lobed stigma. Disc in female flower small, 5-lobed; ovary subglobose; styles filiform, twice as long as the ovary; stigmas large, exserted, forked, branches irregularly pinnately lobed. Capsule shortly ovoid, 4-valved, 4-seeded.—Engl. Jahrb. xxxiv. 154, fig. 1. *C. dioicum*, Schinz in Bull. Herb. Boiss. iii. 414, not of Radlk.

Nile Land. Somaliland: Abdallah, *Keller*, 43; Boran, Tarro Gumbi, *Ellenbeck*, 2076; Djaro, *Ellenbeck*, 2061; Bunder Gumbi, *Ellenbeck*, 2079, and at Marta on the Ganane, *Ellenbeck*, 2032. Gallaland: Rufa Plateau, *Ellenbeck*, 1069; between Ennia-Galla and Arussi-Galla, 1156, and on the Atshabo Plateau, *Ellenbeck*, 1105.

7. **CRESSA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 881.

Sepals coriaceous, obovate, subequal, imbricate. Corolla-tube campanulate; lobes ovate, imbricate in bud, spreading. Stamens and styles exserted; filaments filiform, glabrous; anthers oblong. Disc inconspicuous. Ovary 2-celled, 4-ovuled; styles distinct from the base; stigmas capitate. Capsule 2–4-valved, usually 1-seeded. Seed glabrous, shining; cotyledons linear, plicate.—A much-branched, low-growing, suffrutescent perennial. Leaves small, entire, sessile. Flowers small, aggregated at the tip of the branchlets in bracteate spikes.

One or a few closely allied species.

1. **C. cretica,** *Linn. Sp. Pl. ed.* 1, 223. Stems slender, terete, woody, a few inches to a foot long, with numerous spreading or ascending, hairy, densely-leaved branchlets. Leaves ovate to lanceolate, acute, sessile, ⅙–¼ in. long. Flowers aggregated in dense spikes at the end of the branchlets, each bracteated by a reduced leaf. Calyx hairy, 1½ lin. long. Sepals concave, obovate, subacute. Corolla about

$2\frac{1}{2}$ lin. long; tube cylindrical, enveloped by the calyx; lobes narrowly ovate, about as long as the tube, hairy on the outside. Stamens rather longer than the corolla. Capsule ovoid, $1\frac{1}{2}$–2 lin. long. Pericarp thin, brittle. Seed ovoid, glabrous.—Choisy in DC. Prodr. ix. 440; Hiern in Cat. Afr. Pl. Welw. i. 724; Hallier f. in Engl. Jahrb. xviii. 87, and in Ann. Istit. Bot. Roma, viii., 222.

Upper Guinea. Senegal, *Heudelot! Leprieur! Roger!*

Nile Land. Nubia: near Suakin, *Schweinfurth*, 2164, *Johnston!* Soudan, *Lecard*. Eritrea: Dahlak Archipelago, *Terraciano*, 262, 682, 774, 852, 875; Samhar, *Ragazzi & Pappi*, 1249; Assaorta, *Pappi*, 79.

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6137! 6139! *Gossweiler*, 66! Benguella, *Welwitsch*, 6138!

Also in North Africa, Socotra, Madagascar, and damp sandy places, especially by the sea, in both hemispheres.

8. **SEDDERA**, Hochst. in Flora, 1844, Beil. 7, t. 5.

Sepals acute or obtuse, subequal or the outer slightly larger. Corolla funnel-shaped; lobes very short, or longer. Stamens inserted low down in the corolla-tube; filaments filiform, dilated at the base and often appendaged; anthers oblong. Ovary 2-celled, 4-ovuled, hairy at the apex; style bifid almost or quite to the base; stigmas more or less peltate and orbicular, sometimes bilobed. Capsule 4-valved, valves thinly rigid. Seeds dark brown or black, glabrous; cotyledons broad, plicate.—Small shrubs, with prostrate to suberect branches, sometimes spinescent. Leaves entire, small. Flowers axillary, solitary or aggregated into terminal spikes or into stalked or sessile dense few-flowered cymes. Corolla small, 6 lin. or less in diam.

Species about 15, chiefly African and Arabian.

Spinescent with very small leaves, 4 lin. or less in length.
- Corolla 3 lin. long . . . . . 1. *S. somalensis.*
- Corolla barely 2 lin. long.
  - Leaves 3–4 lin. long . . . . . 2. *S. intermedia.*
  - Leaves not exceeding $2\frac{1}{2}$ lin. long . . . 3. *S. spinescens.*

Spinescent with rather larger leaves, about 6 lin. long . 4. *S. hirsuta.*

Not spinescent.
- Leaves narrow linear . . . . . 5. *S. virgata.*
- Leaves more or less elliptic to ovate.
  - Flowers solitary in the leaf-axils.
    - Flowers subsessile; corolla not exceeding the calyx . . . . . 6. *S. latifolia.*
  - Flowers stalked.
    - Plant barely 4 in. high . . . . 7. *S. humilis.*
    - Stems about 1 ft. high.
      - Flower-stalk long; bracteoles minute . 8. *S. arabica.*
      - Flower-stalk short; bracteoles leafy . . 9. *S. capensis.*

Flowers in dense few-flowered cymes.
- Sepals about 2 lin. long.
  - Cymes subsessile . . . . . 10. *S. suffruticosa.*
  - Cymes on short slender peduncles . . . 11. *S. Welwitschii.*
- Sepals 1 lin. long . . . . . 12. *S. schizantha.*

1. **S. somalensis,** *Hallier f. in Engl. Jahrb.* xviii. 90. A much-branched shrub; branchlets slender, rigid, densely clothed with soft whitish hairs. Leaves rigid, elliptic, obtuse, mucronate, 3–4 lin. long, subsessile, densely pubescent on both sides. Flowers axillary, solitary, on peduncles as long or longer than the leaves; bracteoles minute. Sepals rather rigid, obovate, with acute herbaceous apex, pubescent, subequal, 2 lin. long. Corolla 3 lin. long; expanded limb 4 lin. in diam.; filaments glabrous, the dilated base inconspicuously appendaged. Styles free from the base. Ovary ovoid, hairy at the top. Capsule ovoid-globose, 2 lin. in diam., splitting by 4 thin rigid valves. Seeds blackish, glabrous.—*Breweria somalensis*, Vatke in Linnæa, xliii. 523. *B. hispida*, Franchet, Sert. Somal. 43.

Nile Land. Somaliland: Serut Mountains, near Maid, 5000 ft., *Hildebrandt*, 1562! Adda Galla, *James & Thrupp!* Darra, *Donaldson Smith!*

2. **S. intermedia,** *Hochst. & Steud. in Flora*, 1844, *Beil.* 8. An undershrub, about a foot high; branches spreading, with whitish silky hairs; branchlets subspinose, terete. Leaves oblong-lanceolate, subacute, 3–4 lin. long, sessile, more or less silvery-silky. Flowers 3–4, distant at the end of the branchlets, sessile in the axils of the upper leaves. Sepals ovate-acuminate, 1 lin. long, whitish silky on the outside. Corolla scarcely twice as long as the calyx, tubular-funnel-shaped, sub-villous at the apex.—Choisy in DC. Prodr. ix. 440. *Breweria intermedia*, Hochst. l. c.; Terraciano in Ann. Istit. Bot. Roma, v. 104.

Nile Land. Eritrea: Ferehan Volcano, Hamfilah Bay, *Terraciano.*

3. **S. spinescens,** *Peter in Engl. Jahrb.* xviii. 89. A dwarf sarmentose undershrub, with a thick woody base; young branchlets and leaves clothed with yellowish silky hairs, the former becoming leafless and spinescent at the end. Leaves very small, not exceeding $2\frac{1}{2}$ lin. long to about 1 lin. broad, sessile, ovate-lanceolate to elliptic, complicate and recurved at the tip, growing gradually smaller upwards and obsolete towards the end of the branchlets. Flowers very small, solitary in the axils of the leaves, sessile. Sepals equal, subelliptic, narrowing to the base, acute, $1\frac{1}{2}$ lin. long. Corolla silky, very little longer than the calyx, less than 2 lin. Stamens subequal, glabrous, base dilated into a pair of short lateral auricles. Ovary ovoid, hirsute at the apex. Style divided nearly to the base; stigmas hardly clavate, Capsule very small, shortly ovoid, barely $1\frac{1}{2}$ lin. in diam., silky at the apex, 4-valved. Seeds 4, glabrous, dark brown.—*Breweria* (*?*) *sp.*, Vatke in Linnæa, xliii. 524.

Nile Land. Somaliland: near Yafir, in the Ahl Mountains, 6500 ft., *Hildebrandt*, 890!

4. **S. hirsuta,** *Dammer ex Hallier f. in Ann. Istit. Bot. Roma*, vii. 224. A spiny, branched undershrub, 8–12 in. high, in its foliaceous bracts and sepals showing an affinity with *S. capensis*, but in habit approaching nearer *S. latifolia*. Branches strict, virgate, erecto-patent from a common stem or the outer decumbent, woody, terete,

sparsely pubescent, like the leaves and bracts, with spreading forked hairs, becoming spiny at the tip after flowering, leafless in fruit. Leaves sessile, erect, up to 7 lin. long by $2\frac{1}{2}$ lin. broad, elliptic-lanceolate. mucronate, yellow-silky when young. Flowers axillary, sessile, solitary or geminate; bracts leaf-like, about 2 lin. long and $\frac{3}{4}$ lin. broad. Sepals herbaceous, green, the 2 outer $3\frac{1}{2}$ lin. long, produced from a firmer ovate convex yellow-hirsute base, 1 lin. broad, into a long foliaceous linear-subspathulate apex; the 3 inner shorter. Corolla white, about 4 lin. long, tawny-silky on the outside, except on the commissural segments, deeply 5-fid; lobes subovate. Filaments with a small crenulate stipule-like tooth on each side of the glabrous base. Ovary densely hirsute; style bifid nearly to the base with subequal branches; stigmas 2, minute, subreniform-peltate. Capsule very shortly stalked, barely 3 lin. long, glabrous, 4-valved. Seeds 4, barely $1\frac{1}{2}$ lin. long, trigonous, glabrous, dirty-brown.

Nile Land. Galla Country: near the River Dana, at Agualedoio, *Riva*, 465; and at Dolo, *Riva*, 1189; Malka Korokoro, near the River Tana, *Thomas*, 94.

5. **S. virgata,** *Hochst. & Steud. in Flora*, 1844, *Beil.* 8, *t.* 5, *figs.* 1–10. A much-branched undershrub; branches long, very slender, clothed with adpressed white hairs. Leaves distant, sessile, linear to narrowly linear-lanceolate, ascending, margins sometimes convolute, $\frac{1}{2}$–1 in. long, thinly clothed with adpressed white hairs. Flowers arranged in sparse racemes at the end of the branchlets; pedicels short, bracteate at the base by reduced leaves. Sepals rigid with herbaceous tip, obovate, subacute, subequal, $1\frac{1}{2}$ lin. long. Corolla broadly funnel-shaped, 3 lin. long, densely hairy on the midpetaline areas. Base of filaments triangular, not appendaged, glabrous; styles free almost from the base; stigmas suborbicular. Ovary ovoid, hairy at the top. Capsule globose, 2 lin. in diam., splitting into 4 thinly rigid valves. Seeds black, glabrous.—Choisy in DC. Prodr. ix. 440; Hallier f. in Engl. Jahrb. xviii. 90; Capua in Ann. Istit. Bot. Roma, viii. 221. *Breweria virgata*, Vatke in Linnæa, xliii. 523.

Nile Land. Nubia: Wadi Omareg, *Schweinfurth*, 419! Uaratab Mountain, *Schweinfurth*, 2179! Eritrea: Hamfila Bay, *Terraciano*, 58; Samhar, *Terraciano & Pappi*, 27, 46; Assaorta, *Pappi*, 14, 29, 75; near Saati, *Schweinfurth & Riva*, 580! Bure Peninsula, *Hildebrandt*, 732!

Also in Arabia.

6. **S. latifolia,** *Hochst. & Steud. in Flora*, 1844, *Beil.* 8, *t.* 5, *figs.* B, C. A much-branched, low under-shrub with slender, woody branchlets, clothed with dense, short, velvety-white pubescence. Leaves broadly elliptic, rigidulous, shortly stalked, 2–4 lin. long, clothed with short adpressed white hairs above and beneath, apex and base generally rounded, the former sometimes inconspicuously mucronate. Flowers subsessile, solitary in the axils of the leaves or aggregated into short bracteated terminal spikes. Sepals subequal, obovate, coriaceous and rigid with acute herbaceous apex, 2 lin. long, back pubescent like the leaves. Corolla not exceeding the calyx; limb 2 lin. in diam. when

expanded; tips of midpetaline areas densely hairy. Stamens equal, glabrous; filaments dilated at the base, with short rounded appendages. Ovary obovoid, upper portion hirsute; style divided to the base; stigmas orbicular. Capsule $1\frac{1}{2}$ lin. in diam., splitting into 4 rigid valves. Seeds narrowly ovoid, blackish, glabrous, 1 lin. long.—Choisy in DC. Prodr. ix. 440; Hallier f. in Engl. Jahrb. xviii. 88; Capua in Ann. Istit. Bot. Roma, viii. 221 (incl. varieties). *Breweria argentea*, Terrac. in Ann. Istit. Bot. Roma, v. 104. *B. evolvuloides*, Vatke in Linnæa, xliii. 523, not of Choisy. *B. latifolia*, Hochst. l.c.; Clarke in Hook. f. Fl. Brit. Ind. iv. 224. *Cressa latifolia*, T. Anders. in Journ. Linn. Soc. v. Suppl. i. 25 (excl. syn.).

Nile Land. Macaur Island, on the Nubian coast, *Schweinfurth*, 2158! Eritrea: Bure Peninsula, *Hildebrandt*, 741B! Ailet, *Ehrenberg*; Massowa, Samhar. *Hildebrandt*, 733! Mount Ghedem, near Massowa, 500–1000 ft., *Schweinfurth & Riva*, 109! Hamfilah Bay, *Terraciano*, 19! Assaorta, numerous localities, *Terraciano & Pappi*. Abyssinia: near Gageros, 3500 ft., *Schimper*, 2287!

Also in Socotra, and through Arabia to Scind and the Punjab.

7. **S. humilis,** *Hallier f. in Engl. Jahrb.* xviii. 89. A dwarf much-branched undershrub, scarcely 4 in. high, clothed all over with grey somewhat silky hairs. Leaves dense, subsessile, small, broadly elliptic, acute or mucronate; lower shorter, suborbicular. Flowers solitary, axillary, forming a spike; pedicels short, bearing above the middle a pair of minute subulate bracteoles. Sepals subequal, ovate, acute, $1\frac{1}{2}$ lin. long. Corolla white, more than twice as long as the calyx, broadly funnel-shaped, almost entire; midpetaline areas sparsely silky outside. Stamens included. Styles reaching to the tip of the corolla; stigmas small, flattened above. Capsule very small, acute, 4-valved, silky at the apex; seeds glabrous.

Mozamb. Dist. German East Africa: Masailand, *Fischer*, 29.

8. **S. arabica,** *Choisy in DC. Prodr.* ix. 441. A much-branched under-shrub; branchlets slender, clothed with yellowish pubescence. Leaves elliptic, subsessile, 4–7 lin. long, obtuse, mucronate, rounded at the base, pubescent on both surfaces. Peduncles axillary, $\frac{1}{2}$–1 in. long, usually 1-flowered; bracteoles linear, minute. Sepals subequal, elliptic to obovate, coriaceous with herbaceous acute apex, pubescent, barely 2 lin. long. Corolla twice as long as the calyx; expanded limb 3 lin. in diam. Capsule globose, 4-valved, 2 lin. long. Styles free from the base.—Hallier f. in Engl. Jahrb. xviii. 90; Capua in Ann. Istit. Bot. Roma, viii. 220 (incl. vars.). *Breweria oxycarpa*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 76; Schweinf. Beitr. Fl. Aethiop. 92; Vatke in Linnæa, xliii. 524. *B. evolvuloides*, R. Br. in Salt, Abyss. Append. lxiv. not of Choisy. *Cressa arabica*, Forsk. Fl. Ægypt.-Arab. 54.

Nile Land. Nubia: Erkowit Mountain, *Schweinfurth*, 252! Hor Tamanib, *Lord!* Eritrea: Bogos, *Hildebrandt*, 658B! near Saati, *Schweinfurth & Riva*, 591! Habab, *Terraciano & Pappi*, 602, 603, 649, 739, 880, 909; Mensa, *Terraciano & Pappi*, 2260; Assaorta, *Terraciano & Pappi*, 18; Samhar, *Terraciano & Pappi*, 71; Abyssinia: hills near Adganna, *Schimper*, 1015! near Dehli-Dikeno, 4000 ft., *Schimper*; and without precise locality, *Salt!*

Also in Arabia.

9. **S. capensis,** *Hallier f. in Bull. Herb. Boiss.* vi. 529. An undershrub with tufted prostrate to suberect stems under a foot long, clothed with lax ascending brown hairs. Leaves nearly sessile, elliptic to ovate-elliptic, 6–9 lin. long, obtuse, often shortly mucronate, surfaces and margins more or less pilose, especially on the veins. Flowers solitary, on short axillary peduncles; bracts lanceolate, as long as the calyx. Calyx 4 lin. long; sepals herbaceous, becoming coriaceous at the base, ovate-lanceolate, the inner lanceolate, acute, bearing long hairs on the back and margin. Corolla broadly funnel-shaped, pinkish-white, 6 lin. long; midpetaline areas densely hairy on the limb. Stamens included, subequal; filaments glabrous, gradually broadening at the base, not dentate. Ovary hairy at the top; style branched nearly from the base; stigmas subpeltate, bilobed. Capsule glabrous, shorter than the calyx, $2\frac{1}{2}$ lin. long. Seeds blackish, glabrous.—Rendle in Journ. Bot. 1902, 189. *Evolvulus capensis*, E. Meyer in Drège, Zwei Pflanzengeogr. Documente, 46; Choisy in DC. Prodr. ix. 444; Hallier f. in Engl. Jahrb. xviii. 86. *Breweria capensis*, Baker in Dyer, Fl. Cap. iv. ii. 80.

Mozamb. Dist. Rhodesia: Salisbury, *Rand*, 126! *Gardner!*

Also in South Africa.

10. **S. suffruticosa,** *Hallier f. in Engl. Jahrb.* xviii. 88. Suffruticose; stems erect or spreading, leafy, 1 ft. or more long, with minute adpressed hairs. Leaves shortly petioled, firm, oblong, shortly acute, about 1 in. long, densely hairy like the stem on both surfaces. Flowers in few-flowered dense subsessile axillary cymes, rarely solitary. Calyx hairy, $2\frac{1}{2}$ lin. long. Sepals with an acute herbaceous apex from a tougher ovate base. Corolla white, 3 lin. long, subentire, midpetaline areas sparingly hirsute. Stamens reaching nearly to the top of the lobes. Capsule broadly ovoid, sparingly hirsute at the apex, about $1\frac{1}{2}$ lin. in diam.; seeds 4, black, glabrous.—Hallier f. in Bull. Herb. Boiss. vi. 531. *Seddera mucronata,* Hallier f. in Engl. Jahrb. xviii. 88. *Breweria suffruticosa*, Schinz in Verh. Bot. Ver. Brandenb. xxx. 275. *B. baccharoides*, Baker in Kew Bulletin, 1894, 68. *B. sessiliflora*, Baker, l.c. *Convolvulus mucronatus*, Engl. Jahrb. x. 246.

Mozamb. Dist. German East Africa: Umba Valley, *Smith!* Portuguese East Africa: Zambesi Valley between Tette and the coast, and between Senna and Lupata, *Kirk!* British Central Africa: Ngamiland; Kwebe, 3000 ft., *Lugard*, 184! *Mrs. Lugard*, 203!

Var. *hirsutissima,* Hallier f. in Bull. Herb. Boiss. vi. 531. Plant more robust and more densely hairy; leaves generally larger than in the species, to nearly $1\frac{1}{2}$ in. long by 1 in. broad.—Hiern in Cat. Afr. Pl. Welw. i. 725. *S. conglomerata*, Hallier f. in Bull. Herb. Boiss. v. 1008. *Breweria conglomerata,* Baker in Kew Bulletin, 1894, 68.

Lower Guinea. Angola; Loanda and Barra do Dande, *Welwitsch,* 6160! Loanda, *Gossweiler*, 150! 375!

11. **S. Welwitschii,** *Hallier f. in Engl. Jahrb.* xviii. 88. A delicate undershrub with long slender flexuose branching prostrate stems, thinly clothed with short adpressed hairs. Leaves some-

what membranous, nearly sessile, distant, elliptic-oblong, obtuse, mucronate, about 9 lin., rarely to 2 in. long, sparsely adpressed-hairy on both surfaces. Flowers few (3 or more) in a capitate cyme on short slender erecto-patent peduncles rarely up to 9 lin. long, with a pair of small lanceolate bracts subtending each head. Sepals subequal, elliptic-ovate, shortly acute, back and margin sparsely hairy, barely 2 lin. long. Corolla white, 3 lin. long; tube narrowly funnel-shaped; limb 5-partite; lobes spreading, blunt, the median areas hirsute. Stamens subequal, projecting at the mouth of the corolla; filaments narrowing gradually from the base, not dentate; ovary hairy at the top; style bifid to the base; stigmas peltate, bilobulate. Capsule globose, glabrous, $1\frac{1}{2}$ lin. in diam. Seeds ovoid, dark brown, glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 724.

Lower Guinea. Angola: Loanda, *Welwitsch*, 6151! 6152! 6153! 6154! *Gossweiler!*

Var. *Bakeri*, Hiern in Cat. Afr. Pl. Welw. i. 725. Stems shorter, less branched, more densely leaved, whole plant pubescent.—*Seddera Welwitschii*, var., Hallier f. in Bull. Herb. Boiss. v. 1009. *Breweria microcephala*, Baker in Kew Bulletin, 1894, 68.

Lower Guinea. Angola: Loanda; near Mutollo, *Welwitsch*, 6157! Icoloe Bengo, *Welwitsch*, 6158! Libongo, *Welwitsch*, 6159!

12. **S. schizantha,** *Hallier f. in Bull. Herb. Boiss.* vi. 532. An erect, much-branched undershrub; branches terete, subfuscous, sparsely covered with a minute adpressed pubescence, again branched above; branchlets slender, divaricate, subflexuose. Leaves very shortly petioled, ovate-elliptic, obtuse, minutely mucronate, 1 in. long, 4 lin. broad, grass-green, with sparse adpressed hairs on both surfaces. Peduncles about as long as the leaves, solitary or geminate in the leaf-axils, filiform, strictly erecto-patent, ending in a dense dichasium or a single unilateral cyme, collected into a panicle at the end of the branchlets; bracts and bracteoles minute, lanceolate, approximate at the top of the peduncles; pedicels short, filiform, 1–$1\frac{1}{2}$ lin. long. Flowers small. Sepals chartaceous, with a sparsely ciliolate membranous margin, suborbicular, 1 lin. long. Corolla $2\frac{1}{2}$ lin. long, whitish, cut down to the calyx into 5 ovate obtuse lobes, silky outside, except at the membranous edges, with adpressed unequally forked hairs. Stamens shorter than the corolla; filaments glabrous, abruptly dilated at the base. Ovary ovoid, hairy at the top with a few forked hairs; styles free; stigmas subpeltate, flattened, suborbicular with subemarginate base. Capsule glabrous, 4-valved; seeds 4, minute, glabrous, black.

Lower Guinea. Angola: Mossamedes, *Newton.*

9. **BONAMIA,** Thouars, Hist. Veg. Afr. i. 17, t. 8, extens. (Hallier f. in Bull. Herb. Boiss. v. 804).

Sepals in African species coriaceous, equal or the outer a little longer than the inner. Corolla small, funnel-shaped, white or blue, hairy on the outside except on the commissural areas; midpetaline

areas not sharply defined. Stamens and styles included; filaments dilated and hairy below; anthers oblong with cordate base. Disc inconspicuous or absent. Ovary 2-celled, 4-ovuled, hairy at the apex (in African species); style (in African species) with two unequal branches bearing two globose stigmas. Capsule 2-celled, 4-seeded, opening by 4 valves. Seeds glabrous.—African species shrubby climbers with oblong to lanceolate short-stalked leaves, and dense usually many-flowered cymes (few-flowered in *B. minor*).

About 30 species, widely distributed in the tropics; 3 in Tropical Africa.

Stems clothed with brown hairs.	
Bracts large; flowers blue	1. *B. mossambicensis.*
Bracts small; flowers white	2. *B. cymosa.*
Stems glabrous	3. *B. minor.*

1. **B. mossambicensis,** *Hallier f. in Engl. Jahrb.* xviii. 91. A climber with woody stems, clothed with brown hairs. Leaves subcoriaceous, shortly petioled, elliptic, oblong, subobtuse, mucronate, 1–2 in. long, 5–10 lin. broad, thinly pubescent above, densely coated with brown hairs beneath; petiole 2–3 lin. long. Peduncles axillary, many-flowered, about as long as the cymes; bracts large, elliptic to obovate, acute, 6 lin. long and 3 lin. broad, covered on back and margin with a rusty tomentum. Sepals thinly glumaceous, elliptic-oblong, acute, unequal, the outer 3 lin. long, glabrous except the apex. Corolla bright blue, campanulate-funnel-shaped, 9 lin. long, not distinctly lobed. Ovary hairy at the apex, 2-celled, 4-ovuled; style unequally bifid above the middle; stigmas obovate, globose, granulate. Capsule and seeds unknown.—Hallier, f. in Bull. Herb. Boiss. v. 996; Dammer in Engl. Pfl. Ost-Afr. C. 328. *Breweria buddleoides*, Baker in Kew Bulletin, 1894, 69. *Prevostea mossambicensis*, Klotzsch in Peters, Reise Mossamb. Bot. 244, t. 39.

Mozamb. Dist. German East Africa: Usaramo; Dar es Salem, *Stuhlmann*, 8467; Kisserawe, *Stuhlmann*, 6178; and without precise locality, *Stuhlmann*, 105, 6166; by the Rovuma River, *Kirk!* Portuguese East Africa: Rio de Sena *Peters.*

2. **B. cymosa,** *Hallier f. in Engl. Jahrb.* xviii. 91. A woody climber, reaching 12 ft. long; stems slender, terete, densely clothed with short brown hairs. Leaves oblong to oblong-lanceolate, subcoriaceous, shortly petioled, 1–3 in. long, obtuse with mucronulate apex, rounded at the base, green and glabrous above with sunk nerves when dry, matted with brown hairs and with prominent nerves beneath. Cymes dense, many-flowered, usually secund on short peduncles or congested into a terminal panicle; bracts minute; pedicels short, silky. Sepals oblong-lanceolate to ovate, shortly acuminate, 4 lin. long, the inner slightly shorter, glumaceous, ferruginously silky on the back. Corolla white, twice as long as the calyx, obscurely lobed, ferruginously silky except on the commissural areas. Style bifid only above the middle. Capsule globose, rigid, glabrous, as long as the calyx. Seeds black, glabrous.—Hallier f. in Bull. Herb. Boiss. v. 996. *Breweria secunda*, Benth. in Hook. Niger Fl. 470. *Convolvulus*

cymosus, Roem. & Schult. Syst. Veg. iv. 303. *C. Senegambiæ*, Spreng. Syst. i. 610. *Ipomœa Afzelii*, Choisy in DC. Prodr. ix. 373. *I. secunda*, Don, Gen. Syst. iv. 282; Choisy l.c. 390. *I. Senegambiæ*, Choisy l.c. 351.

Upper Guinea. Gambia, *Ingram!* Sierra Leone, *Don! Smeathman! Afzelius! Barter! Hart! Morson! Stormont! Scott-Elliot*, 3930! 4170! 5599! 5835! 5836! Liberia: near Monrovia, *Whyte!* Ashanti: Assin Yan Kumassi, *Cummins*, 165! Lagos, *Barter*, 2227! 20167! *Millen*, 34! Cameroons: Barombi, *Preuss*, 268; Batanga, *Dinklage*, 684.

3. **B. minor,** *Hallier f. in Engl. Jahrb.* xviii. 91. Stem shrubby, climbing, glabrous, finely striate. Leaves shortly petioled, lanceolate-obovate. above an inch long, 6 lin. broad, subacute, mucronate, narrowed gradually to the base, glabrous above and becoming so beneath, fascicled in the leaf axils at the lower nodes; petiole about 2 lin. long. Cymes 1–3-flowered, shortly peduncled, subspicate at the end of the branchlets; peduncle and pedicels about 2 lin. long. Calyx ovoid, silky; sepals equal. elliptic, coriaceous. Corolla funnel-shaped, subentire, silky outside on the midpetaline areas, about 7 lin. long.—Hallier f. in Bull. Herb. Boiss. v. 999.

South Central. Congo Free State: Katanga: Lukafu, *Verdeck*, 592. Lomami River, *Pogge*, 1214. Kazembe River, a tributary of the Lualaba River, *Descamps*.

10. **NEUROPELTIS**, Wall.; Benth. et Hook. f. Gen. Pl. ii. 878.

Sepals subequal, much imbricated. Corolla deeply 5-lobed; lobes induplicate-valvate; stamens inserted in the corolla-tube; filaments filiform; anthers oblong. Disc very small. Ovary imperfectly 2-celled, 4-ovuled; styles distinct from the base, simple; stigmas peltate, flattened. Capsule coriaceous, 1-seeded. Seed globose, glabrous; embryo plicate.—Wide-climbing shrubs, with woody stems. Leaves subcoriaceous, glabrous, entire, petioled. Flowers small, white, forming a panicle with racemose branches; bracts very accrescent, in a late stage scariose, bearing fruit in the centre.

Species 4, two in Tropical Asia.

Branches and leaves not ferruginously hairy . .	1. *N. acuminata.*
Branches and undersurface of leaves densely ferruginously hairy	2. *N. velutina.*

1. **N. acuminata,** *Benth. in Hook. Niger Fl.* 469. A shrubby climber, 30–40 ft. high, with stout woody stems bearing soft adpressed hairs in the younger parts. Leaves elliptic tending to obovate, 2½–4 in. long, cuspidate, rounded to subdeltoid at the base, subcoriaceous, glabrous to glabrescent; petiole 1 in. long. Flowers in cylindrical terminal and axillary racemes 5–6 in. long on the shorter branches; rhachis with short ferruginous hairs. Pedicels short, becoming 6–9 lin. long in the fruiting stage, and adnate to a scarious orbicular bract 1½–2 in. long and broad. Sepals orbicular, with ciliate margins, 1 lin.

long. Corolla 3 lin. long, with a short tube and 5 widely spreading elliptic-ovate lobes. Stamens as long as the corolla. Ovary cone-shaped, densely ferruginously hairy; styles sparsely pilose; stigmas peltate with two long, flattened, irregularly lobulate branches. Capsule ovoid, glabrous, 3 lin. long; pericarp rather thin, splitting lengthwise. Hallier f. in Engl. Jahrb. xviii. 92. *Porana acuminata*, Beauv. Fl. Owar. i. 66, t. 39; Choisy in DC. Prodr. ix. 436.

Upper Guinea. Sierra Leone, *Don!* Oware, *Beauvois!* Cameroons: Victoria, *Kalbreyer*, 11! Bipinde, *Zenker*, 1934! 1235!

2. **N. velutina,** *Hallier f. in Bull. Herb. Boiss.* v. 374. A climbing shrub; branches rather thick, terete, densely clothed with ferruginous hairs. Leaves shortly petioled, obovate-elliptic, 4 in. long by nearly half as broad, cuspidate at the apex, subcordate at the base, hairy only on the ribs above, densely ferruginous, velvety beneath; lateral nerves about 7 each side, erecto-patent. Flowers absent; fruits numerous, crowded in a long branched pyramidal terminal panicle more than 1 ft. long and nearly as broad; lateral branches solitary in the axils of ordinary foliage leaves, slender erecto-patent, simple or sparsely branched. Bracts with a short thin pedicel, suborbicular, up to 2 in. long, subacuminate at the base and apex, ending in a filiform ferruginous mucro. Sepals suborbicular, 1 lin. long, obtuse or subacute, ferrugineo-tomentose. Capsule ovoid, 3–4 lin. long, glabrous, indehiscent.

Upper Guinea. Cameroons: Batanga, *Dinklage*, 786, 1009.

11. **PREVOSTEA,** Choisy in Ann. Sci. Nat. sér. i. iv. (1823) 497.

Sepals membranous to subcoriaceous, in African species ovate to orbicular, blunt, or the inner shortly acute, the 2 outer larger than the inner and accrescent, forming large membranous structures in the fruit. Corolla moderate to small, urceolate or campanulate, apparently generally white, lobes large or small, spreading. Stamens and styles included; filaments dilated at the base, generally glabrous. Style long, unequally divided, rarely to the middle. Stigmas broad, ellipsoidal to globose. Fruit 1-celled and 1-seeded (where known).—Climbing shrubs with large elliptic subcoriaceous leaves. Flowers rather small, in sessile or subsessile axillary cymes.

Species 9, two in South America, one in Madagascar, and six in Tropical Africa.

Corolla urceolate.
- Corolla more than 6 lin. long . . . . . 1. *P. africana.*
- Corolla 3 lin. long . . . . . 2. *P. micrantha.*

Corolla campanulate
- Corolla more than 1 in. long . . . . . 3. *P. campanulata.*
- Corolla not exceeding 1 in.
  - Outer sepals less than 3 lin. long . . . . 4. *P. Heudelotii.*
  - Outer sepals 4 lin. long . . . . . 5. *P. Cabræ.*

1. **P. africana,** *Benth. in Hook. Niger Fl.* 469, *t.* 46. A climbing shrub; branchlets slender, woody, subglabrous, dark brown. Leaves narrowly obovate-oblong, abruptly long-acuminate, subcoriaceous, glabrous above, glabrescent below, 5–6 in. long, 1½–2 in. broad at the middle, narrowed gradually to the base; petiole 6–9 lin. long. Flowers 2–5 in cymes sessile in the axils of the leaves; bracts minute, linear, ferrugineo-pubescent; pedicels slender, obscurely pubescent, barely 1 lin. long. Outer sepals broadly cordate-ovate, obtuse, the outermost reaching 6 lin. long, the 3 inner much smaller, ovate, acute, all sparsely puberulous. The outer larger, forming in the fruit a flat membranous reticulately veined suborbicular structure with cordate base and overlapping lobes 2–2½ in. long, the inner ellipsoidal, similar in texture but smaller, about 1½ in. long. Corolla whitish, ⅝–¾ in. long; tube suburceolate; limb spreading; lobes short, broad. Stamens shorter than the corolla-tube; filaments dilated at the base, glabrous. Style bifid but not to the middle. Stigmas large, peltately ellipsoidal. Disc obsolete. Ovary incompletely 2-celled, 4-ovuled. Fruit 1-celled, 1-seeded, presumably indehiscent but not seen ripe.—*P. alternifolia,* Hallier f. in Engl. Jahrb. xviii. 92; Dammer in Engl. Jahrb. xxiii. Beibl. 57, 57. *Codonanthus africanus,* G. Don, Gen. Syst. iv. 166. *C. alternifolia,* Planch. in Hook. Ic. t. 796. *Breweria Codonanthus,* Baker ex Oliver in Hook. Ic. Pl. 2276. *B. alternifolia,* Radlkof. in Abhandl. Nat. Ver. Bremen, viii. 413 in note.

Upper Guinea. Sierra Leone: near Kafogo, *Scott-Elliot,* 5518! and without precise locality, *Don!* Lagos, *Moloney!* Cameroons: Yaunde, *Zenker,* 713! 799! Bipinde, *Zenker,* 2662!

2. **P. micrantha,** *Dammer in Engl. Jahrb.* xxiii. 57. A shrub 7–9 ft. high; branches long, slender, densely puberulous when young, ultimately glabrous. Leaves elliptic or obovate, nearly 4½ in. long and 2⅓ in. wide, apex long acuminate, base rounded to truncate; median nerve adpressed puberulous beneath, ultimately glabrous; petiole barely 6 lin. long, adpressed puberulous. Flowers 6–8, on very short axillary puberulous peduncles, 1½ lin. long. Two outer sepals cordate-ovate, membranous, 2 lin. long, sparsely puberulous outside, the three inner ovate, acute, 1 lin. long, with ciliate margin. Corolla about 4 lin. long, white, urceolate; tube very short, sparsely puberulous below the ovate acute lobes. Stamens unequal, filaments less than 1 lin. long, thickened at the base, puberulous to the middle. Ovary ovoid, glabrous; style 3 lin. long, tripartite to the middle. Stigmas orbicular, glabrous.

Upper Guinea. Cameroons: Johann-Albrechtshöhe, *Staudt,* 637!

3. **P. campanulata,** *K. Schum ex Peter in Engl. & Prantl, Pflanzenfam.* iv. 3A. 17. A climbing shrub; branchlets slender pubescent. Leaves obovate-oblong, cuspidate, subcoriaceous, 3–5 in. long, 1½–3 in. broad, narrowed from the middle to a rounded base, shining and glabrous above, opaque and pubescent beneath; petiole under 1 in. long. Flowers in sessile axillary cymes; pedicels silky, under 1 in. long. Calyx 4–6

lin. long at the flowering time; sepals very unequal, the outer orbicular, very accrescent, finally scariose, 2 in. in diam. Corolla campanulate, pubescent, $1\frac{1}{4}$–2 in. long to $1\frac{1}{2}$ in. in diam.; lobes ovate. Stamens shorter than the corolla-tube. Style bifid to the middle. Capsule not seen.—Hallier f. in Engl. Jahrb. xviii. 92; De Wild. & Durand in Comptes-rendus Soc. Bot. Belg. xxxix. 71. *Breweria campanulata*, Baker in Kew Bulletin, 1894, 68. *B. mirabilis*, Baker ex Oliv. in Hook. Ic. Pl. t. 2276.

Upper Guinea. Gaboon : Munda; Sibange Farm, *Soyaux*, 79, 80 !

4. **P. Heudelotii,** *Hallier f. in Bull. Herb. Boiss.* v. 1009. A climbing shrub; branchlets terete, glabrous, woody, pale brown. Leaves ovate-elliptic, obtuse, shortly acuminate, coriaceous, glabrous on both surfaces, rounded at the base, 3–5 in. long, 2–$2\frac{3}{4}$ in. broad; petiole $\frac{1}{2}$–1 in. long. Flowers crowded in the leaf-axils; peduncle none; pedicels short, up to 6 lin. long, densely hoary, pubescent, like the bracteoles and calyx, with a pair of small opposite ovate-elliptic, concave bracteoles at the middle about 1 lin. long. Outermost sepal subcoriaceous, orbicular, with subcordate base, $2\frac{1}{2}$ lin. long, the second similar but rather narrower, the 3 inner suborbicular, 2 lin. long, much thinner, the 2 outer enlarging in the fruit as in *P. africana*. Corolla $\frac{3}{4}$–1 in. long; tube campanulate; lobes spreading, ovate, 4 lin. long. Stamens included in the corolla-tube; filaments glabrous. Style unequally bifid above the middle. Fruit as in *P. africana*.—*Breweria Heudelotii*, Baker ex Oliv. in Hook. Ic. Pl. t. 2276, and in Kew Bulletin, 1894, 68.

Upper Guinea. Senegambia, *Heudelot*, 864 ! Sierra Leone: Duunia, Talla Hills, *Scott-Elliot*, 5018 ! Berria, Falaba, *Scott-Elliot*, 5230 ! Mount Gonkwi, *Scott-Elliot*, 4866 !

Var. *minor*, Rendle. Leaves up to $3\frac{1}{2}$ in. long by 2 in. broad; lateral veins 7–8 on each side, more regular than in the type. Corolla 8–9 lin. long, narrower with smaller and less spreading lobes.

Upper Guinea. Gold Coast : *Dawodu*, 585 ! Aburi Hills, *Johnson*, 614 !

5. **P. Cabræ,** *De Wild. & Durand in Comptes-rendus Soc. Bot. Belg.* xxxix. *fasc.* 3, 70. A shrub 15–20 ft. high; branchlets terete, glabrous, lenticellate; bark exfoliating, grey, scaly. Leaves petioled, elliptic, 2–3 in. long, 1–2 in. broad, apex cuneate and obtuse, cuneate or rather rounded at the base, quite glabrous on both surfaces; nerves subopposite about 7 on each side of the midrib, slightly prominent beneath. Flowers fascicled about 7 together, axillary; peduncle absent; pedicels slender, barely 6 lin. long, velvety as are the ovate basal bracts, $\frac{2}{3}$ to nearly $1\frac{1}{4}$ in. long ! (" 1·5–3 cm." ? mm.). Outer sepals suborbicular, about 4 lin. long, obtuse, cordate at the base, hairy on both surfaces; inner similar but paler and half as long. Corolla 1 in. long, pilose outside, enlarged towards the 5-lobed apex; lobes triangular, obtuse, 3 lin. long. Filaments glabrous, about as long as the corolla-tube; anthers lanceolate, $1\frac{1}{2}$ lin. long. Ovary glabrous; style unequally bifid, 8 lin. long; stigmas small, globular.

Lower Guinea. Lower Congo: Mayombe, *Cabra*, 88, 92.

I have not seen this species, but from the description it is evidently very closely allied to *P. Heudelotii*, scarcely differing, except in the somewhat larger sepals, unless we accept the measurement given for the bracts.—*A. B. R.*

Imperfectly known species.

6. **P. Poggei,** *Dammer ex Hallier f. in Mém. Soc. Bot. Belg.* xxxvii. pl. 1. 88 (*name only*).

South Central. Congo Free State: Lunda; Mukenge, *Pogge*, 1172, 1090.

12. DIPTEROPELTIS, Hallier f. in Jahrb. Hamb. Wiss. Anstalt. xvi. Beiheft. 3, 4, cum tab., and in Engl. Jahrb. xxviii. 28.

Sepals 5, free, imbricate, unequal, the two outer ovate, longer and broader than the three inner, very accrescent, and finally orbicular-reniform, looking like a wing to the capsule. Corolla much larger than the calyx, campanulate, deeply 5-fid. Stamens inserted low down in the corolla; filaments filiform; anthers oblong. Disc small, cupular. Ovary conical, 1-celled, 2-ovuled; style deeply bifid; stigmas linear-oblong. Capsule small, ovoid-conical, splitting from the base into linear scales.—A climbing shrub with elliptic-obovate, weakly acuminate leaves, with entire to emarginate base. Flowers small in terminal or axillary narrow panicles, bearing remote, solitary or paired cincinnous cymes; bracts and bracteoles minute, linear.

Endemic, monotypic,

1. **D. poranoides,** *Hallier f., ll. cc.* 5, 29. A climbing shrub. Leaves elliptic-obovate, 2½–4 in. long by half as broad, generally more or less acuminate, weakly mucronate, base rounded to emarginate, glabrescent on the upper surface, sparsely shortly hairy beneath, especially on the veins; lateral veins 6–7 on each side of the midrib, joining in intramarginal arches. Panicles axillary, long-peduncled, above a foot long, laxly many-flowered; bracts minute, linear. Outer sepals 1½ lin. long and broad, reaching 1⅓ in. long by 1½ broad in the fruit. Corolla small, white; lobes 4 lin. long by 3 lin. broad, ferrugineo-tomentose outside. Capsule 3 lin. long.

Upper Guinea. Cameroons: Lolodorf, 2000–2500 ft., *Staudt*, 287; *Zenker*, 1383! Bipinde, *Zenker*, 1781!

13. PORANA, Burm.; Benth. et Hook. f. Gen. Pl. ii. 876.

Sepals subequal, oblong, very accrescent, finally rigid and spreading. Corolla campanulate or funnel-shaped; limb plicate, subentire or shortly lobed. Stamens included or slightly exserted; filaments linear or filiform. Pollen unarmed, ellipsoid with 3 longitudinal folds. Disc annular or absent. Ovary 2-celled, 2- or 4-ovuled; style long or short,

usually forked. Stigmas capitate. Fruit small, subglobose, 1-seeded, indehiscent or finally splitting. Seeds glabrous; cotyledons plicate. Stems wide-climbing. Leaves entire, usually petioled and cordate. Flowers purple, blue or white, generally very small, numerous, often (including the African species) panicled.

Species 10, the others spread through Tropical Asia to North Australia.

1. **P. densiflora,** *Hallier f. in Engl. Jahrb.* xviii. 93. Stems woody, climbing, glabrous. Leaves petioled, ovate, apex obtuse to acuminate, cuspidate, base entire to slightly cordate, glabrous, thin and membranous when dry, 2–3 in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ in. broad. Flowers very small, congested in clusters at the end of the main axis and branches of stalked axillary panicles, and forming a terminal panicle at the end of the branch. Younger portion of inflorescence and pedicels covered with pale brownish adpressed somewhat silky hairs, which occur also on the backs of the sepals and densely cover the unopened corolla. Sepals equal, barely 1 lin. long, coriaceous, orbicular. Corolla very small ($\frac{1}{5}$–$\frac{1}{4}$ in. long), broad funnel-shaped; lobes lanceolate-oblong, emarginate, with broad membranous margins, strongly limited from the hairy midpetaline area. Styles 2; stigmas capitate; ovary globose, 4-ovuled. Fruit not seen.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!* between Mombasa and Witu, *Whyte!*

Mozamb. Dist. German East Africa: Usambara; Duga, *Holst,* 3205! Buiti, *Holst,* 2379! Kiriamo, ex *Dammer*; and without precise locality, *Fischer,* 284.

14. **JACQUEMONTIA,** Choisy; Benth. et Hook. f. Gen. Pl. ii. 874.

Sepals subequal, or the outer broader, sometimes cordate at the base. Corolla funnel-shaped, 5-angled, obscurely 5-lobed. Stamens inserted low down in the corolla-tube; filaments filiform or slightly dilated at the base; anthers oblong. Ovary 2-celled, 4-ovuled; style entire, filiform; stigmas 2, distinct, elliptic to orbicular, thick. Capsule globose, 2-celled, 4-valved. Seeds glabrous, scabridulous in the African species.—Herbs or shrubs, with twining or prostrate glabrous or hairy stems. Leaves usually cordate-ovate, entire. Flowers usually cymose or capitate, small, blue or white.

Species 60 or more; the others American.

Flowers densely crowded in heads.	
Corolla blue, twice as long as the calyx . . .	1. *J. capitata.*
Corolla white, equal to the calyx	2. *J. thomensis.*
Flowers in few- to many-flowered cymes.	
Leaves more or less oval	3. *J. ovalifolia.*
Leaves cordate-ovate	4. *J. paniculata.*

1. **J. capitata,** *G. Don, Gen. Syst.* iv. 283. Annual. Stems slender, twining or trailing, finely pilose. Leaves ovate, generally acute, 2–3 lin. long, base shallowly cordate or flat to shortly abruptly acute

dark green, glabrescent or more or less pilose (often ferruginously) on both surfaces, margin pilose, thin; veins subprominent beneath; petiole shorter than the blade. Peduncle generally long, often exceeding the leaves. Flowers many in a dichotomously forked cyme forming a globose head, about 1 in. in diam., bracteated by reduced leaves with narrowing entire base, the inner becoming smaller and more hairy ultimately resembling the sepals. Calyx $2\frac{1}{2}$ lin. long, shaggy with soft brown hairs; sepals subequal, lanceolate, acute. Corolla blue, fugacious, twice as long as the calyx. Capsule globular, about 2 lin. in diam., bright brown, glabrous; valves 4, brittle. Seeds 4, bright brown, scabridulous.—Hallier f. in Engl. Jahrb. xviii. 95; Hiern in Cat. Afr. Pl. Welw. i. 725; Baker & Wright in Dyer, Fl. Cap. iv. ii. 69. *Ipomœa capitata*, Choisy in DC. Prodr. ix. 365; Benth. in Hook. Niger Fl. 467, Oliver in Trans. Linn. Soc. xxix. 115; Durand & Schinz, Études Fl. Congo, 204. *I. guineensis*, G. Don, l.c. 269. *I. macropoda*, Bojer, Hort. Maur. 229. *I. Convolvulus* var. *guineensis*, Schum. & Thonn. Beskr. Guin. Pl. 90. *Convolvulus pycnantha*, Hochst. ex Choisy in DC Prodr. ix. 365.

Upper Guinea. Liberia: Cape Palmas, *Vogel*, 38! Senegal, *Roger! Perrottet!* Gold Coast: Accra, *Ansell!* Dahomey, *Burton!* Togo, *Kling*, 176; *Warnecke*, 245! Northern Nigeria, *Barter!*

Nile Land. Kordofan, *Kotschy*, 212! *Pfund*, 17! 142! 487! *Cienkowsky.* Moru, *Petherick!* Jur, *Schweinfurth*, 2384! Madi, *Speke & Grant!* British East Africa, *Thomas*, 206! *Wakefield! Whyte! Kässner*, 34!

Lower Guinea. Gaboon, *Büttner*, 387! *Soyaux*, 440! Lower Congo, *Smith!* Loango, *Soyaux*, 14 bis. Stanley Pool, *Hens*, B, 35! Lutete, *Hens*, A, 263! Dembo, *Gilet;* Kinchassa, *Demeuse;* Bingila, *Dupuis.* Angola, *Welwitsch*, 6215! 6216! 6217! 6218! *Gossweiler*, 276! 411! *Monteiro!*

Mozamb. Dist. Zanzibar, *Bojer! Hildebrandt*, 991! German East Africa: Usambara; *Holst*, 2681! Portuguese East Africa: near Sena, *Kirk!* British Central Africa: Nyasaland; Shire Valley, *Scott!* Lukoma, Lake Nyasa, *Bellingham!* Rhodesia; between Bulawayo and Zambesi, *Eyles*, 129!

Also in South Africa, and the Mascarene Islands.

Var. *pauciflora*, N. E. Br.—Heads of flowers smaller and less dense, 3–10-flowered.

Mozamb. Dist. Ngamiland: Kwebe Hills, 3300 ft., *Lugard*, 183! *Mrs. Lugard*, 169!

2. **J. thomensis,** *Henriq. in Bol. Soc. Brot.* x. 143. Stem slender, twining, branched, pilose with reflexed hairs. Leaves lanceolate, cordate or sagittate at the base, mucronate, pilose, $1\frac{1}{2}$–3 in. long.; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. long. Clusters of flowers hairy, axillary, subsessile; peduncle 1–$1\frac{1}{2}$ lin. long; bracts linear, rarely longer than the pedicels; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Sepals linear-lanceolate, equal, 3 lin. long. Corolla white, campanulate, as long as the calyx, sparsely villous and densely ciliate at the lobes; ovary densely villous; stigma orbicular, flattened. Capsule villous, equal to the calyx, 4-valved. Seeds dull brown, minutely punctulate.

Upper Guinea. Island of St. Thomas, *Moller.*

Distinguished from *I. capitata* by the shorter heads of flowers, and the form and size of the bracts. It may perhaps be the *Ipomœa* No. 9 of Hooker's *Niger Fl.* 467.

3. **J. ovalifolia,** *Hallier f. in Engl. Jahrb.* xviii. 96. Annual or biennial. Stem branched from the base; branches slender, elongated, ascending, glabrous. Leaves oblong or oblong-lanceolate to elliptic, entire, obtuse, narrowed to the base, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, glabrous, "rather fleshy and somewhat glaucous green, soft and almost greasy to the touch" (*Welwitsch*); petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. long. Peduncle short, slender, few-flowered, under 1 in. long; lower bracts like the leaves but small and deciduous, the upper minute; pedicels slender, shorter than the flower. Calyx glabrous, about 2 lin. long; sepals herbaceous, the two outer obovate-elliptic, reaching nearly 3 lin. long, blunt to shortly acute, the inner smaller, ovate, shortly acute to acute. Corolla blue, twice as long as the calyx, glabrous. Capsule globose, reddish-brown, glabrous, $2\frac{1}{2}$ lin. in diam. Seeds scabridulous, dull brown.—Hiern in Cat. Afr. Pl. Welw. i. 726. *Ipomœa ovalifolia*, Choisy in Mém. Soc. Phys. Genève, vi. 449, and in DC. Prodr. ix. 357; Benth. in Hook. Niger Fl. 466. *I. oleracea*, Welw. Apont. Phyto-Geogr. 589 no. 74. *Convolvulus cœruleus*, Schum. & Thonn. Beskr. Guin. Pl. 101.

Upper Guinea. Guinea, *Thonning!* Gold Coast: Accra, *Vogel! Don! Brown*, 374! and without precise locality, *Krause! Isert!* Cape Coast Castle, *Brass!* Togo: near Lome, *Warnecke*, 254!

Nile Land. Somaliland: near Web Karanle River, *Riva*, 1004. British East Africa: Lake Dumi, *Gregory!*

Lower Guinea. Angola: Loanda, *Welwitsch*, 6252! *Gossweiler*, 165! Mossamedes, *Welwitsch*, 6121! Dammaraland, *Hopfner*, 21.

4. **J. paniculata,** *Hallier f. in. Engl. Jahrb.* xviii. 95. Annual. Stems slender, wide-climbing, pubescent, as are also the petioles and peduncles. Leaves cordate-ovate, acuminate, $1\frac{1}{4}$–2 in. long, membranous, upper surface glabrescent, lower surface sparsely pubescent, mainly on the thinly prominent nerves; petiole slender, about half as long as the blade. Flowers several to many in a dense cyme; peduncle slender, stouter and longer than the petiole, $1\frac{1}{2}$–2 in. long; pedicels barely 3 lin. long; bracts minute, deciduous. Sepals subequal-ovate, acute to acuminate, pubescent, $2\frac{1}{2}$ lin. long. Corolla pinkish-white, twice the length of the calyx. Capsule globose, glabrous, $2\frac{1}{2}$ lin. in diam., 2-celled; valves 4, brittle. Seeds 4, scabridulous.—*J. umbellata*, Bojer Hort. Maurit. 229. *Convolvulus parviflorus*, Vahl, Symb. iii. 29; Choisy in DC. Prodr. ix. 413; Vatke in Linnæa, xliii. 522.

Nile Land. British East Africa: Ribe and Nyika country, *Wakefield!*

Mozamb. Dist. German East Africa: Usaramo; Bagamoyo, *Hildebrandt*, 1267!

Also in the Mascarene Isles, Tropical Asia, and North Australia.

15. **ANISEIA**, Choisy in Mém. Soc. Phys. Genève, vi. 481.

Sepals herbaceous, obtuse to acute, the 3 outer much larger, ovate and more or less decurrent on the peduncle. Corolla broadly and shortly funnel-shaped, entire, very hairy in bud, sepaline areas glabrous in the open flower. Pollen globose, not spinose. Ovary glabrous, 2-celled; stigma bicapitate; disc obsolete. Capsule 4-valved, 2-celled, 4-seeded. Seeds large, black, glabrous except on the edges. —Climbing herbs. Leaves elliptic to lanceolate, entire. Peduncles axillary, generally 1-flowered; bracts small, narrow.

Species few, natives of Tropical America, one also occurring in the tropics of the Old World.

1. **A. uniflora,** *Choisy in Mém. Soc. Phys. Genève*, vi. (1834), 483. Perennial. Stems slender, twining, thinly pubescent. Leaves shortly petioled, oblong to linear-oblong, oblong-lanceolate or lanceolate, firm, thinly pubescent, 1–2 in. long, narrowed to the base, obtuse with a small mucro. Peduncles 1-flowered, 1–1½ in. long; bracts minute, lanceolate. Calyx 6–8 lin. long in flower, becoming 9 lin. long in fruit; outer sepals ovate, obtuse, becoming scariose; inner lanceolate. Corolla white, densely hairy on the ribs, regularly funnel-shaped, 1 in. long. Capsule ovoid, glabrous, as long as the calyx, 4-valved. Seeds glabrous, black, punctulate, with short flat hairs on the edges, 2½ lin. long, as large as a pea.—Choisy in DC. Prodr. ix. 431; Benth. in Hook. Niger. Fl. 468. *A. martinicensis*, Choisy in Mém. Soc. Phys. Genève, viii. (1838), 144, and in DC. Prodr. ix. 430; Hallier f. in Engl. Jahrb. xviii. 96 incl. var. *ambigua*. *Convolvulus martinicensis*, Jacq. Hist. Stirp. Amer. 26, t. xvii. *Ipomœa lanceolata*, G. Don, Gen. Syst. iv. 282; Choisy in DC. Prodr. ix. 390. *I. uniflora*, Roem. & Schult. Syst. iv. 247.

Upper Guinea. Senegal, *Heudelot*, 707! *Roger*, 38! Sierra Leone, *Don! Garrett*, 25! *Scott-Elliot*, 4051! 5271! 5696! Lagos: Abeokuta, *Barter*, 3340! Southern Nigeria: Ndoni, *Barter!* Cameroons, *Buchholz*.

Lower Guinea. Angola: Cuanza River, *Johnston!*

Mozamb. Dist. Zanzibar, *Stuhlmann*, 113.

Cosmopolitan in the tropical zone.

16. **CONVOLVULUS**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 874.

Sepals generally subequal, obtuse or acute. Corolla funnel-shaped, colour various, midpetaline areas not well defined, passing gradually into the sepaline areas. Stamens inserted low down in the corolla-tube; filaments generally unequal, filiform. Ovary 2-celled, 4-ovuled; style filiform; stigmas two, filiform. Capsule 2-celled, usually 4-valved, 4-seeded. Seeds black or brown, glabrous, or pubescent, sometimes tuberculate; cotyledons broad, plicate.—Herbs or shrubs with climbing, prostrate or erect stems. Leaves simple. Flowers solitary, in few-flowered cymes or in dense involucrate heads.

Species about 150, in the temperate and subtropical regions of both hemispheres; rarer in the tropics.

* XEROPHYTÆ.—Small perennial undershrubs with slender branches rising more or less erect from the woody rootstock, or spreading; cauline leaves very small; flowers not in involucrate heads.

Branches erect, spinescent at the tip.
Corolla several times longer than the calyx, 9 lin. long . . . . . 1. *C. sericophyllus.*
Corolla but little longer than the calyx, barely 6 lin. long . . . . . 2. *C. Hystrix.*
Branches bearing short spiny branchlets . . . 3. *C. Ruspolii.*
Branches not spiny.
Flowers very laxly arranged on filiform almost leafless shoots . . . . . 4. *C. Hildebrandtii.*
Flowers 1–3 together, subsessile in the leaf-axils.
Cauline leaves less than 6 lin. long . . 5. *C. microphyllus.*
Cauline leaves more than 6 lin. long . . 6. *C. pluricaulis.*
Flowers few on conspicuous pedicels . . . 7. *C. Deserti.*

** CAPITATÆ.—Annual or perennial herbs; stems more or less erect, prostrate or twining; flowers aggregated in sessile or stalked, involucrate, generally densely hairy heads.

Heads sessile or shortly stalked.
Corolla about twice as long as the calyx.
Leaves linear-oblong to oval, $\frac{1}{3}$–1 in. long . . 8. *C. littoralis.*
Leaves subspathulate with cordate or subhastate base, $\frac{1}{2}$ in. long . . . . . 9. *C. subspathulatus.*
Leaves oblong or oblanceolate, 1–2 in. long . 10. *C. rhyniospermus.*
Corolla scarcely exceeding the calyx.
Seeds puberulous . . . . . 11. *C. capituliferus.*
Seeds papillose-tuberculate . . . . 12. *C. hamphilahensis.*
Heads conspicuously stalked, subtended by a pair of leafy bracts . . . . . 13. *C. glomeratus.*

*** ARVENSES.—Herbaceous, or shrubby below, rarely suffruticose; stems slender prostrate, or more often twining, at any rate at the ends; flowers solitary in the leaf-axils or in slender-stalked few-flowered cymes; bracts generally very small.

Suffruticose; stems erect, covered with silvery, silky pubescence . . . . . 14. *C. Randii.*
Herbaceous or shrubby; stems prostrate or climbing, rarely ascending (not silvery).
Leaves lanceolate, acute; flowers minute (corolla 3 lin. long) . . . . . 15. *C. agrestis.*
Leaves oblong with entire base . . . . 16. *C. angolensis.*
Leaves sagittate.
Sepals crisped . . . . . 17. *C. ulosepalus.*
Sepals not crisped . . . . . 18. *C. sagittatus.*
Leaves ovate with small entire basal auricles . 19. *C. huillensis.*
Leaves ovate with hastate base.
Corolla 4 times as long as calyx . . . 20. *C. arvensis.*
Corolla scarcely twice as long as calyx . . 21. *C. Schweinfurthii.*
Leaves cordate-ovate.
Stems climbing; leaves shallowly crenate . . 22. *C. farinosus.*
Stems diffuse; leaves deeply crenate . . . 23. *C. fatmensis.*

**** ANOMALÆ.—Climber with long-stalked ovate-cordate leaves and large (for the genus) flowers aggregated in bracteate heads on long peduncles.
Only species . . . . . 24. *C. Kilimandschari.*

1. **C. sericophyllus,** *T. Anders. in Journ. Linn. Soc.* v. *Suppl.* i. 25. A shrubby perennial, reaching 6 ft. in height, much branched from the base; branches strictly ascending, terete, woody, spinescent at the tip, slightly silky when young, glabrate when mature. Leaves silky, acicular, lower oblanceolate, shortly acute, to 1 in. long, upper growing gradually smaller and passing into the bracts. Flowers 1–3, fascicled, forming terminal racemes. Peduncle up to 9 lin. long, generally much shorter. Sepals cartilaginous, ovate-acuminate, minutely silky, very small, barely more than 1 lin. long. Corolla silky, 6–9 lin. long. Capsule glabrous. Seeds black, opaque.—Hallier f. in Engl. Jahrb. xviii. 97. *C. acicularis*, Vatke in Linnæa, xliii. 518.

Nile Land. Somaliland: Coast plain, near Wodderi, *Hildebrandt*, 885! foothills near Maid, *Hildebrandt*, 1516; valley below Bihen, *Miss Cole!*

Also at Aden. *C. somaliensis*, Franch. Sert. Somal. 43, not of Vatke, is probably identical.

2. **C. Hystrix,** *Vahl, Symb.* i. 16. An erect shrub; branchlets numerous, short, spreading, hairy, ending in sharp spines. Leaves small, stiff, sessile, 6 lin. long or less, rarely reaching 2 lin. broad, oblong, tapering slightly towards the subobtuse apex, silky. Flowers axillary, sessile, usually solitary. Calyx 3 lin. long, clothed with short brown hairs; 2 outer sepals larger, orbicular; 3 inner ovate. Corolla hairy on the midpetaline areas, little longer than the calyx, nearly 5 lin. long. Capsule not seen.—Choisy in DC. Prodr. ix. 400. Hallier f. in Engl. Jahrb. xviii. 100, and in Ann. Istit. Bot. Roma, vii. 226.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth*, 2151! coast-land, *Bent!* Eritrea: Berber, *Riva*, 251; Obbia, Garad, *Robecchi-Bricchetti*, 497.

Also in Egypt, Arabia and Syria.

3. **C. Ruspolii,** *Hallier f. in Ann. Istit. Bot. Roma*, vii. 225. A densely spiny shrub; branches terete, of the first order elongated, of the higher orders gradually shorter, spreading at right angles and ending in a leafless spine; the younger adpressed and minutely puberulous. Leaves not more than 6 lin. long and less than $1\frac{1}{2}$ lin. broad, linear-lanceolate from a subtruncate base, on the branches of the first and second order and at the base of the branchlets, becoming gradually smaller, glabrous above, with a few adpressed hairs beneath; petiole barely 1 lin. long. Flowers 1–5, at the very base of the branchlets of the third order, small, peduncled, 1–$1\frac{1}{2}$ lin. long, bearing above the middle two minute opposite lanceolate bracts. Calyx ovoid, $2\frac{1}{2}$ lin. long; sepals glumaceous, ovate-lanceolate, sparsely ciliolate at the apex, otherwise glabrous, the two outer recurved at the tip, the 3 inner a little smaller. Corolla funnel-shaped, $4\frac{1}{2}$ lin. long, 5-lobed, glabrous, with scattered glands between the nerves. Filaments glandular-pubescent at the gradually dilated base; anthers linear-sagittate, somewhat twisted. Disc minute, cupular, 5-crenate. Ovary ovoid, glabrous. Capsule not seen.

Nile Land. Somaliland: near Milmil, in the Ogaden desert, *Riva*, 297.

4. **C. Hildebrandtii,** *Vatke in Linnæa*, xliii. 519. Perennial, suffruticose; stems virgate, pilose, terete, slender; branches very slender. Lower leaves congested into a basal rosette, bearing long hairs, oblanceolate, 1 in. long, repand or subcrenate, narrowed at the base into the petiole, shorter than the blade; lower stem-leaves narrowly oblanceolate, becoming rapidly narrower to linear as we ascend the stem. Flowers 1–2, rarely 3–5, laxly cymose, on a very slender silky peduncle 2–3 in. long; bracts short, acicular; pedicels short, 2 lin. long. Sepals ovate, shortly acuminate, $1\frac{1}{2}$ lin. long, with a few adpressed hairs on the back. Corolla three times the length of the calyx, slightly silky on the nerves. Capsule glabrous. Seeds black, pubescent.—Hallier f. in Engl. Jahrb. xviii. 97. *C. filipes*, Balf. f. in Proc. Roy. Soc. Edin. xii. (1883) 22.

Nile Land. Somaliland: Coast plain, near Wodderi, *Hildebrandt*, 884!
Also in Socotra.

5. **C. microphyllus,** *Sieber ex Spreng. Syst.* i. 611. Perennial, suffruticose. Stems slender, terete, densely tufted, spreading, more or less softly hairy. Cauline leaves generally less than 6 lin. long, rarely 9 lin., oblong or oblong-lanceolate, obtuse, subsessile, narrowed to the base, hairy on both sides. Radical leaves narrowly spathulate, reaching nearly 1 in. long. Flowers 1–3 together from the upper nodes of the stem, generally nearly sessile, sometimes stalked, sometimes on short flowering branches. Sepals ovate, acuminate, about $2\frac{1}{2}$ lin. long, densely clothed with brown hairs. Corolla pinkish-white, funnel-shaped, twice as long as the calyx, hairy outside. Capsule small, globose. Seeds glabrous.—Choisy in DC. Prodr. ix. 402; Wight, Ic. t. 1367; Franch. Sert. Somal. 42, forma *glabrescens*. *C. scindicus*, Boiss. Diag., ser. 2, iii. 123, not of Stocks.

Nile Land. Nubia: Berber, *Kotschy*, 354! Wady Selem, east of Berber, *Schweinfurth*, 2149; Dongola, *Ehrenberg*; near Wady Allagni and Wady El-Arab, *Letourneux*, 280. Somaliland, *Révoil.*
Also in Egypt, and extending through Arabia to Scind.

6. **C. pluricaulis,** *Choisy in Mém. Soc. Phys. Genève*, vi. 477. Perennial, suffruticose, ferruginously pilose. Stems slender, terete suberect or ascending or spreading, regularly leaved. Leaves linear-oblanceolate, nearly $1\frac{1}{4}$ in. long and shortly petioled below, becoming smaller, less than 1 in., linear-oblong, subsessile above the base, blunt, hairy on both sides. Flowers solitary or in pairs, shortly stalked or subsessile in the leaf-axils; bracts linear, less than 3 lin. long. Calyx densely silky hairy; sepals subequal, $2\frac{1}{2}$ lin. long, lanceolate to ovate, pallid and coriaceous, with green herbaceous acuminate tips. Corolla shortly funnel-shaped, pallid, 4 lin. long, hairy in bud. Capsule globose, stramineous, less than 2 lin. in diam. Seeds 4, brown, unequally shortly pubescent.—Choisy in DC. Prodr. ix. 403; Hallier f. in Engl. Jahrb. xviii. 98. See also Benth. in Hook. Niger Fl. 468, and C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 218.

Upper Guinea. Senegal, *Heudelot*, 403!
Also in Northern India.

7. **C. Deserti,** *Hochst. & Steud. in Herb. Un. Itin.* 783; *Steud. Nom. ed.* 2, i. 408, *name only.* Suffruticose. Stems slender, terete, spreading, somewhat sparsely hairy, with spreading or adpressed hairs. Leaves linear-oblong with tapering base to linear-spathulate, subsessile, the lower reaching $1\frac{3}{4}$ in. long in the African specimen, usually shorter, blunt, adpressed, hairy on both surfaces, midrib prominent beneath. Flowers borne in the leaf-axils along the whole length of the stems. Peduncles slender, hairy like the stem, about 6 lin. long in the African plant and bearing 1 or 2 closely aggregated flowers. Bracts narrow, linear, about 3 lin. long, bearing (like the sepals) adpressed and spreading pale brownish hairs. Sepals ovate, coriaceous below with acuminate green herbaceous tips, subequal, 3 lin. long. Corolla funnel-shaped, 7 lin. long in the African plant, pallid with darker pubescent midpetaline areas.—*C. microphyllus*, Choisy in DC. Prodr. ix. 402, partly.

Nile Land. Nubia: Sea-coast to between 3000 and 4000 ft., *Bent!*
The African specimen consists of a small young plant with a few spreading stems, the main one reaching 6 in. long.
Also in Arabia.

8. **C. littoralis,** *Vatke in Linnæa*, xliii. 519. Stems several, ascending up to 1 ft. long, simple, filiform, slightly pilose. Leaves distant, small, oval-oblong, obtuse, subsessile, about 4 lin. long and half as broad, on the short sterile shoot larger, narrowly oblong, narrowed to the base, 1 in. long, including the short stalk, pilose on both sides, grey-green. Flowers in small globose sessile or shortly peduncled clusters down the stem, surrounded by many oblong, acute, silky bracts, which are about as long as the calyx. Sepals narrowly lanceolate to oblong-acuminate, about $2\frac{1}{2}$ lin. long, very hairy. Corolla barely twice as long as the calyx, hairy outside. Seeds minutely tubercled.—Hallier f. in Engl. Jahrb. xviii. 99, and in Ann. Istit. Bot. Roma, vii. 225. *C. sphærophorus*, Baker in Kew Bulletin, 1895, 221.

Nile Land. Somaliland: near Lasgori, *Hildebrandt*, 865b; and without precise locality, *Miss Cole!*

9. **C. subspathulatus,** *Vatke in Linnæa*, xliii. 520. An undershrub?, clothed upwards with reddish, somewhat silky pubescence; branches elongated, about $1\frac{1}{2}$ ft. long, branched above. Leaves shortly petioled, subspathulate, about 6 lin. long up to 5 lin. broad, cordate or subhastate at the base, very obtuse. Lower peduncles up to 6 lin. long; cymes involucrate, densely 1–3-flowered, scorpioid; bracts foliaceous. Sepals ovate, usually subobtuse, 2 lin. long, barely exceeding $\frac{1}{2}$ lin. broad. Corolla twice as long as the calyx, hairy outside. Capsule glabrous. Seeds black, glabrous, tubercled.—Hallier f. in Engl. Jahrb. xviii. 100, and in Ann. Istit. Bot. Roma, vii. 226.

Nile Land. Somaliland: near Barava (Brava), *Hildebrandt*, 1312; *Kirk!* near Faro River, *Riva*, 1713.

10. **C. rhyniospermus,** *Hochst. ex Choisy in DC. Prodr.* ix. 405. Annual, herbaceous. Stems slender, densely tufted, suberect or trailing, 3–12 lin. long, clothed with short bright brown hairs. Leaves oblong or oblanceolate, obtuse, narrowed to the base, 1–2 in. long, smaller on the flowering stems, subsessile, slightly hairy. Flowers all the way up the stem in shortly peduncled or subsessile few-flowered clusters, sometimes solitary, surrounded by oblong to oblong-lanceolate bracts, the outer foliaceous, the inner about as long as, and resembling the sepals. Sepals oblong-lanceolate, acute, 3 lin. long, densely clothed with bright brown hairs, the three inner smaller and narrowly lanceolate, Corolla twice as long as the calyx, hairy. Capsule globose, glabrous, 3 lin. in diam., beaked with the persistent style-base. Seeds 4, minutely papillose.—Wight Ic. t. 1368; Hallier f. in Engl. Jahrb. xvii. 100; Terracc. in Ann. Istit. Bot. Roma, v. 105; Capua in Ann. Istit. Bot. Roma, viii. 232. *C. involucellatus*, Klotzsch in Peters, Reise Mossamb. Bot. 241.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth,* 2166! Eritrea: islands in Hamfila Bay, *Terracciano,* 80, 148, 193. Dahlac Archipelago, *Pappi,* 4463; *Franzesi,* 3. Kordofan: near Kohn Mountain. *Kotschy,* 235! Somaliland: Hagdar, near the River Genane, *Riva,* 1126.

Mozamb. Dist. Portuguese East Africa: Inhambane, *Peters.*

Also extending through Arabia to Scind.

11. **C. capituliferus,** *Franch. Sert. Somal.* 41. Stems many from a shrubby base, prostrate, hispid; leaves small, shortly petioled, silky on each side. Flowering branches short, secund, leafy, springing along the whole length of the stem; flowers small, crowded. Sepals unequal, lanceolate, acute, with long adpressed hairs. Corolla scarcely exceeding the calyx, $2\frac{1}{2}$ to 3 lin. long, funnel-shaped, sparsely hairy on the outside. Ovary 2-celled, 2–4-ovuled. Seeds usually solitary in the chamber, puberulous.—Hallier f. in Engl. Jahrb. xviii. 100.

Var. *filiformis,* Franch. l. c. Stamens prostrate, thinly hairy with adpressed hairs; leaves broadly obovate or nearly rotund.

Var. *suberectus,* Franch. l. c. Stems ascending, a little thicker, with spreading stiff hairs; leaves lanceolate, subacute.

Nile Land. Somaliland: *Révoil.*

Near *C. microphyllus,* but differing mainly in its smaller corolla, more unequal sepals, and whitish pubescence.

12. **C. hamphilahensis,** *Terracc. in Ann. Istit. Bot. Roma,* v. 105. Cæspitose. Stems short, erect, flowering from base to apex. Leaves oblong-lanceolate, acute, obscurely green, subpetioled, bearing scattered long white hairs. Flower-heads globose, sessile, covered with white tomentum, shorter than the bract. Sepals lanceolate, acute, woolly. Corolla equal in length to the calyx, shortly hairy on the outside at the apex. Capsule thin, glabrous, 2–4-seeded. Seeds papillose-tuberculate. —Capua in Ann. Istit. Bot. Roma, viii. 232.

Nile Land. Eritrea : Assaorta, *Terracciano*, 16, 34, 42. Dahlac Archipelago, *Terracciano*, 264, 349; *Terracciano & Pappi*, 615 ; and Midir Island and Achil Island, in Hamfila Bay, *Terracciano*, 148.

Not seen ; apparently closely allied to *C. capituliferus*, but the seeds of the latter are described as puberulous.

13. **C. glomeratus,** *Choisy in DC. Prodr.* ix. 401. Perennial; stems many from the hard woody base, long, slender, terete, trailing or twining, finely hairy, often scabridulous. Leaves lanceolate to oblong-lanceolate, $\frac{1}{4}$–1 in. long, base slightly cordate, flattened or obscurely cuneate, apex obtuse to acute, mucronulate ; sparsely adpressed pilose on both surfaces ; petiole very short. Flowers in dense globose bracteate ferruginously hairy heads, on slender peduncles which are generally shorter than the leaves ; outer bracts large, foliaceous, up to 8 lin. long, inner smaller, lanceolate, acute, a little longer than the calyx. Sepals ovate-lanceolate, up to 5 lin. long, the 2 outer much larger than the inner, densely clothed with bright brown hairs. Corolla pinkish-white, hairy, 6 lin. long. Capsule globose, glabrous, $2\frac{1}{2}$ lin. in diam., pale brown. Seeds blackish-brown, scabrid.—Wight, Ic. t. 1366 ; Vatke in Linnæa, xliii. 518 ; Terracc. in Ann. Istit. Bot. Roma, v. 104. *C. congestus*, R. Br. in Salt, Abyss. App. lxiv. *C. arabicus*, Hochst. ex Hallier f. in Engl. Jahrb. xviii. 100 ; Capua in Ann. Istit. Bot. Roma, viii. 231. ? *Ipomœa auricoma*, A. Rich. Tent. Abyss. ii. 67 ; Schweinf. Beitr. Fl. Aethiop. 94.

Nile Land. Nubia : between Suakim and Hor Tamanib, *Lord !* Gebel Uaratab, near Suakim, *Schweinfurth*, 2167 ! Macaur Island, *Schweinfurth*, 2170 ! Somaliland, *Mrs. Lort Phillips !* Eritrea : Samhar, near Massowah, *Hildebrandt*, 723 ! *Pappi*, 1288, 1289. Hababb, *Terracciano & Pappi*, 1290, 1291 ; *Hildebrandt*, 584 ; Assaorta, *Terracciano & Pappi*, 29. Ketumbal Island, *Ehrenberg*. Island in Howapel Bay, *Salt !* Dahlac Archipelago, *Steudner*, 940 ! *Terracciano*, 612, 613, 614. Hamfila Bay and Islands, *Terracciano*. Abyssinia : ascending to 4000 ft., *Schimper*, 341 ! 784. *Dillon, Roth*, 425 !

Var. *abbreviata*, Terracc. in Ann. Bot. Istit. Roma, v. 105. Low growing. Heads and leaves more crowded.

Nile Land. Eritrea : Achil Island, in Hamfila Bay, *Terracciano*.

Also in Socotra, and extending through Syria to North-West India.

14. **C. Randii,** *Rendle in Journ. Bot.* 1902, 189. Erect, suffruticose, clothed with silvery silky pubescence; branched from the base ; branches slender, about 16 in. long, rising in a tuft less than 1 lin. in diam., and densely leafy except at the base. Leaves linear-lanceolate, $\frac{3}{4}$ to 1 in. long, subobtuse, more densely pubescent beneath ; petiole 1 lin. long or less. Flowers usually solitary on slender axillary peduncles 6–9 lin. long, bearing a pair of small filiform bracts, 2–3 lin. long about the middle. Sepals coriaceous, ovate, acute, 5 lin. long, the two inner rather shorter ; pubescent like the leaves where exposed. Corolla funnel-shaped, twice the length of the calyx, silky outside on

the midpetaline areas. Capsule truncately turbinate, 2 lin. long, abruptly mucronate. Seeds compressed, black.

Mozamb. Dist. Rhodesia: Gwelo district, in woods, *Rand*, 274!

15. **C. agrestis,** *Hallier f. in Engl. Jahrb.* xviii. 101. Annual. Stems, several from the base, ascending to suberect, the upper portions sometimes climbing, unbranched, with spreading rufescent hairs, 1½–1 ft. long. Leaves thin, lanceolate, shortly petioled, ¾–1½ in. long, more or less hairy, with short adpressed reddish-brown hairs, especially on the upper face, truncate at the base. Flowers 1–2-nate on slender ascending peduncles ¼–1 in. long from the axils of the leaves, and bearing the characteristic hairs; bracts narrow, linear; pedicels 3 lin. long or less, becoming thicker above, about 2 lin. long, becoming longer and recurved in fruit. Sepals 2½ lin. long, elliptic, subcoriaceous, becoming herbaceous and abruptly acute above, margin ciliate, back glabrescent and pale green, becoming dark green and hairy towards the apex. Corolla scarcely longer than the calyx, barely 3 lin. long. Capsule membranous, 3 lin. in. diam., opening irregularly. Seeds ½ lin. long, black, glabrous, tuberculate.—Capua in Ann. Istit. Bot. Roma viii. 229 (incl. forma *major*). *C. siculus*, A. Rich. Tent. Fl. Abyss. ii. 73, not of Linn. *Evolvulus agrestis*, Schweinf. Beitr. Fl. Aethiop. 92; Engl. Hochgebirgsfl. Trop. Afr. 345. *Ipomœa agrestis*, Hochst. in Buching. Verz. No. 73.

Nile Land. Nubia; Soturba Mountain, *Schweinfurth*, 2192! Abyssinia: Arba Tensesa, *Schimper*, 362! 362β: near Debra-Eski, 9300 ft., *Schimper*, 73; Ataba, *Steudner*, 955; and without precise locality *Schimper*, 1294. Eritrea: Assaorta, *Pappi*, 3441; Amasen, *Ragazzi*, 20; *Terracciano & Pappi*, 454; Oculè-Cusai, *Pappi*, 4358, 4425, 4427.

16. **C. angolensis,** *Baker in Kew Bulletin*, 1894, 67. Perennial. Stem slender, spreading, clothed with whitish mostly adpressed hairs. Leaves less than 6 lin. long, thick, oblong to oblong-lanceolate, base entire, truncate, nearly sessile, clothed with adpressed whitish hairs, sparsely above, densely beneath. Flowers solitary, on short slender peduncles 6 lin. long, bearing a pair of short linear tapering densely hairy bracts about ⅔ from the base. Sepals elliptic, obtuse, shortly cuspidate, silky, 3 lin. long. Corolla whitish, 7 lin. long, hairy in bud. Capsule not seen.—*C. sagittatus*, var. *grandiflorus*, subvar. *subcordata*, Hallier f. in. Bull. Herb. Boiss. vi. 534 partly.

Lower Guinea. Angola: Cunene River, *Johnston!*

The specimen (which is a very meagre one) consists of a few slender shoots, 1–3 in. long, springing from a small piece of woody stem, the upper part of which has been burnt. It suggests a new growth after a fire, and is probably not a fair representation of the plant. I cannot follow Hallier in regarding this as identical with the Abyssinian *C. sagittatus*, var. *subcordata*. Nor do I think, with the material at hand, that we are justified in regarding it as a form of *C. sagittatus*.

17. **C. ulosepalus,** *Hallier f. in Engl. Jahrb.* xviii. 103. Stems several from a common base, 2 ft. long, slender, simple or sparsely branched, prostrate, often flexuose like the whole plant, excepting the

younger parts, glabrous or sparsely hirsutulous. Leaves hastate-sagittate, exceeding $1\frac{1}{2}$ in. long, 1–2 lin. broad in the middle, $2\frac{1}{2}$–5 lin. at the base; median lobe long, linear, entire, obtuse; basal lobes short, falcately decurved, obtruncate; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Peduncle $\frac{1}{5}$ in. to $1\frac{1}{4}$ in. long, thin, rigid, bearing several (rarely only one) small, short-stalked, densely crowded, somewhat nodding flowers. Sepals small, ovate-lanceolate, acute, apex herbaceous from a paler subcoriaceous base, green, crisped, recurved, the outer a little longer, $2\frac{1}{2}$ lin. long, sparsely silky on the back especially at the apex. Corolla 4 lin. long, white, with red-brown stripes, distinctly lobed.—*C. hastatus*, Choisy in DC. Prodr. ix. 407, partly, not of Thunb.

Lower Guinea. Damaraland, *Pechuel-Lösche*, *Höpfner*, 94.
Also in South Africa.

18. **C. sagittatus,** *var.* **abyssinica**, *Hallier f.* (*as subvar.*) *in Bull. Herb. Boiss.* vi. 533. A somewhat more robust plant than the species, more or less glaucous green when dry. Stems long slender, prostrate, more or less grey or brownish, sometimes silky pubescent. Leaves $1\frac{1}{4}$ to $2\frac{1}{4}$ in. long, varying considerably in breadth, but larger and generally broader than in the species, rarely reaching 6 lin. broad, basal lobes recurved, often toothed or multifid, pubescent like the stem. Flowers 1–2, rarely more, on slender more or less elongated peduncles. Bracts narrow linear; pedicels about as long as or longer than the calyx, sometimes shorter. Sepals 3–4 lin. long, broadly ovate, obtuse and apiculate or cuspidate, to subacute, bearing on the back the characteristic pubescence. Corolla white or pink, 4–5 lin. long. Capsule globose, glabrous, about 3 lin. in diam. Seeds 4, brown, glabrous.—Rendle in Journ. Bot. 1901, 61 *C. penicillatus*, Rich. Tent. Fl. Abyss. ii. 74; Hallier f. in Engl. Jahrb. xviii. 103. *C. Aschersoni*, Engl. Hochgebirgsflor. Trop. Afr. 349. *C. sagittatus*, var. *macroglottis*, Baker ex Rendle in Journ. Bot. 1896, 39.

Nile Land. Eritrea: near Saganeïti, 7000 ft., *Schweinfurth & Riva*, 1739! near Acrour, 6500 ft., *Schweinfurth & Riva*, 1061! Bogos, *Hildebrandt*, 498! Habab, 6000 ft., *Hildebrandt*, 497, 499; Abyssinia: Misshall, 7000 ft., *Schimper*, 660! Somak Efat, *Roth*, 424! and without precise locality, *Schimper*, 1130. Somaliland: Habrawal, *Smith!* British East Africa: Leikipia, *Gregory!* near Nyanza, *Scott-Elliot*, 7145!

Lower Guinea. Angola: Ambaca, *Welwitsch*, 6204! Huilla, *Welwitsch*, 6116!

Mozamb Dist. German East Africa: Lower plateau, north of Lake Nyassa, *Thomson*! British Central Africa: Rhodesia; Salisbury, *Rand*, 510! *Mrs. Evelyn Cecil*, 74! Ngamiland; near Kwebe, *Lugard*, 77!

Var. *villosa*, Hallier f. (as subvar.) in Bull. Herb. Boiss. vi. 533. Shoots up to 8 in. long, densely leaved, and (especially in the younger part) densely and softly fulvous-villous. Leaves narrowly cordate-sagittate, less than 1 in. long, subacute, margin obscurely sinuate: petiole very short. Peduncles 1-flowered, less than 1 in. long, bearing a fulvous pubescence like the sepals. Corolla 4 lin. long.—*C. Thomsoni*, Baker in Kew Bulletin, 1894, 67.

Mozamb. Dist. German East Africa: Lower plateau, north of Lake Nyassa, *Thomson!*

Var. *subcordata*, Hallier f. l.c. 534 (as subvar.) partly. Perennial, with a rather stout woody rhizome; aerial shoots tufted, slender, elongated, prostrate, shortly fulvous pubescent in the younger part, glabrescent below. Leaves triangular-ovate, acute, with a cordate base, reaching about 1 in. long, the older ones very sparsely pilosulose on both surfaces, more densely on the veins beneath. Peduncles 1-flowered, brown pubescent like the young stem, rarely more than 1 in. long, bearing a pair of short linear bracts above the middle. Sepals pubescent like the young shoots, elliptic, shortly acute, barely exceeding 3 lin. long. Corolla rose-coloured, said to reach 10 lin. long (about 7 lin. in the specimen in Herb. Kew.). Seeds dark brown, glabrous, apparently smooth.—*C. Steudneri*, Engl. Hochgebirgsfl. Trop. Afr. 350; Hallier f. in Engl. Jahrb. xviii. 104.

Nile Land. Abyssinia: high plateau of Talanta, *Rohlfs*, 16; Tanta, near Magdala, *Steudner*, 956; and without precise locality, *Schimper*, 165!

Also in Southern Arabia.

Var. *linearifolia*, Hallier f. (as subvar.) in Bull. Herb. Boiss. vi. 534. A climber, glaucous, very thinly puberulous: branches filiform. Leaves long linear, minutely auricled at the base, acute, up to $2\frac{1}{2}$ in. long, 1–2 lin. broad; petiole $2\frac{1}{2}$ lin. long. Peduncle rather thick, about 8 lin. long; pedicel equal to the peduncle. Sepals ovate-lanceolate, with a very thin grey somewhat silky covering on the back. Corolla barely 9 lin. long, white, the midpetaline areas silky outside.—Hallier f. in Baum, Kunene-Sambesi Exped. 345; Baker & Wright in Dyer, Fl. Cap. iv. ii. 72.

Lower Guinea. Angola: by the Chitanda River, between Goudkopje and Kakele, 4000 ft., *Baum*, 180!

Also in South Africa.

19. **C. huillensis,** *Rendle.* Stems trailing, silky hairy. Leaves ovate, apiculate from a subobtuse apex, entire, silky hairy, $\frac{1}{2}$–1 in. long, with small entire basal auricles; petiole very short. Hairs on the younger part of shoot and the calyx pale fulvous. Peduncles 1-flowered, hairy, about 1 in. long, with a pair of short persistent filiform bracts at the middle. Calyx very hairy, 4 lin. long. Sepals lanceolate to ovate, acute. Corolla not seen. Capsule globose, pale brown, glabrous, 4 lin. in diam., shortly beaked with the persistent style-base. Seeds glabrous, black, areolate.—*C. sagittatus*, var. *grandiflorus*, subvar. *subcordata*, Hallier f. in Bull. Herb. Boiss. vi. 534 partly; Hiern in Cat. Afr. Pl. Welw. i. 726. *Ipomœa huillensis*, Baker in Kew Bulletin, 1894, 70.

Lower Guinea. Angola: Huilla; Ferrao da Sola, 3800–5500 ft., *Welwitsch*, 6131!

20. **C. arvensis,** *Linn. Sp. Pl. ed.* 1, 153. Perennial. Stem wide-climbing, glabrous or slightly pubescent. Leaves ovate-hastate, 1–2 in. long, with spreading or deflexed usually acute basal lobes; petiole $\frac{1}{2}$–1 in. long. Flowers 1–3, laxly cymose; peduncle long, slender, flexuose; pedicels longer than the calyx, $\frac{1}{2}$–$\frac{3}{4}$ in.; bracts short, narrowly linear. Sepals coriaceous, subequal, elliptic-oblong, obtuse, $\frac{1}{6}$ in. long, glabrous or slightly pubescent, especially on the margin. Corolla broadly funnel-shaped, 9 lin. long, pinkish-white. Capsule globose, glabrous, 3 lin. in diam. Seeds glabrous.—Choisy in DC. Prodr. ix. 406;

A. Rich. Tent. Fl. Abyss. ii. 73; Engl. Hochgebirgsfl. Trop. Afr. 350; Hallier f. in Engl. Jahrb. xviii. 108; Capua in Ann. Bot. Istit. Roma, viii. 230. *C. cirrhosus*, R. Br. in Salt, Abyss. App. lxiv. name only.

Nile Land. Abyssinia: near Gennia, *Schimper*, 133! Addi Dschoa, 7000 ft., *Schimper*, 518! and without precise locality, *Salt!* White Nile, *Petherick!* Eritrea, 5000–8000 ft.: Assaorta, *Pappi*, 3506, 3445; Amasen, *Terracciano & Pappi*, 330, 2442; Oculè Cusai, *Pappi*, 4404, 3823, 3851; Bogos, *Terracciano & Pappi*, 2666; Mensa, *Terracciano & Pappi*, 1690, 1290.

Widely spread in temperate regions of both hemispheres.

21. **C. Schweinfurthi,** *Engl. Hochgebirgsfl. Trop. Afr.* 348. Perennial. Stems twining, clothed with short brown hairs. Leaves ovate-hastate, 1½–2 in. long, entire or obscurely crenate, rounded at the apex with a small mucro, finely pubescent; basal sinus broad and open; petiole 1–1½ in. long. Flowers 2–5 in a cyme; peduncle long or short, ¼–2 in. long; pedicels longer than the calyx; stout, more or less quadrangular in section; bracts minute, lanceolate, acute. Sepals orbicular-ovate, pubescent, barely 3 lin. long. Corolla scarcely twice as long as the calyx, hairy outside. Stamens half as long as the corolla, resembling that of *C. farinosus*. Capsule globose, barely 4 lin. in diam., glabrous, brown. Seeds 4, blackish, scabridulous.—Hallier f. in Engl. Jahrb. xviii. 105.

Nile Land. Eritrea, 4500–6500 ft.: Mensa, *Terracciano & Pappi*, 1073; Amasen, *Terracciano & Pappi*, 179. Abyssinia: Anadehr, 7000 ft., *Schimper*, 599!

Scarcely separable from *C. farinosus*.

22. **C. farinosus,** *Linn. Mant.* 203. Stems slender, climbing, pubescent. Leaves long-petioled, cordate-ovate, membranous, finely pubescent, 1–3 in. long, usually irregularly and shallowly crenate, with large rounded auricles, and a broad basal sinus. Cymes 1–6-flowered on long slender axillary peduncles; pedicels long or short; bracts minute, lanceolate. Sepals coriaceous, 3 lin. long, elliptic, cuspidate or acute, glabrous or sparsely pubescent. Corolla 5 lin. long, white, with brown ribs, pubescent at the tip of the short lobes. Capsule globose, shortly pungent, 2½ lin. in diam., glabrous, brown. Seeds blackish, scabridulous—Choisy in DC. Prodr. ix. 412; Hallier f. in Engl. Jahrb. xviii. 104; Baker & Wright in Dyer, Fl. Cap. iv. ii. 74. *C. cordifolius*, Thunb. Prodr. 35. *C. Sprengelii*, Choisy in DC. Prodr. ix. 416. *C. quinqueflorus*, Vahl, Symb. iii. 31.

Nile Land. Eritrea: Haichello Kokob, north of Acrur, 5000 ft., *Schweinfurth & Riva*, 1104!

Mozamb. Dist. German East Africa: Usambara, *Holst*, 672; *Buchwald*, 579! Karagwe, 4000 ft., *Stuhlmann*, 1727.

Also in South Africa and the Mascarene Isles.

23. **C. fatmensis,** *Kunze in Flora*, 1840, 172. Stems slender, diffuse, 1–2 ft. long, pubescent towards the tip. Leaves distinctly petioled, cordate-ovate, membranous, obtuse, ½–1½ in. long, thinly pubescent, deeply and irregularly crenate with rounded auricles and a

broad basal sinus; petiole often as long as the blade. Flowers 1–2 on short sparsely pubescent axillary peduncles, 9 lin. long or shorter; bracts short, filiform. Sepals subequal, $2\frac{1}{2}$ lin. long, coriaceous, obovate, with rounded apex; pedicels shorter than the calyx. Corolla less than 6 lin. long, hairy outside, white with brown stripes. Capsule globose, 3 lin. in diam. Seeds glabrous.—Hallier f. in Engl. Jahrb. xviii. 108.

Nile Land. Kordofan, *Pfund.*

Also in North Africa and Arabia.

24. **C. Kilimandschari,** *Engl. Hochgebirgsfl. Trop. Afr.* 348. Perennial. Stems climbing, clothed, like the leaves and peduncles, with long hairs. Leaves oblong, 2–3 in. long, obtuse with a mucro, deeply cordate at the base; petiole 6 lin. long. Peduncles many-flowered, longer than the petiole; bracts ovate, acute, scariose. Sepals ovate, mucronate, scariose, densely pilose, 4 lin. long. Corolla broadly campanulate, above 1 in. long. Filaments half as long as the corolla, pilose, dilated at the base.—Hallier f. in Engl. Jahrb. xviii. 109. *Bonamia althoffiana,* Dammer in Engl. Pfl. Ost-Afr. C. 329. *Hewittia Kilimandschari,* Hallier f. in Bull. Herb. Boiss. v. 1008. *Ipomœa cephalantha,* Baker in Kew Bulletin, 1894, 69.

Mozamb. Dist. German East Africa: Kilimanjaro, 6009–9000 ft., *Meyer; Johnston,* 184! above Marangu, *Volkens,* 1559; Uru, *Volkens,* 1882.

Var. *glabratus,* Hallier f. in Engl. Jahrb. l.c. Stem and leaves glabrescent when mature.—*C. Schimperi,* Engl. Hochgebirgsfl. Trop. Afr. 347, not of Boiss.

Nile Land. Abyssinia: Begemeder; Gafat, 8200 ft., *Schimper,* 1465!

17. **CALYSTEGIA,** R. Br.; Benth. et Hook. f. Gen. Pl. ii. 874.

Sepals subequal or the inner rather smaller. Corolla usually large and showy, campanulate or funnel-shaped, slightly lobed. Stamens inserted low down in the corolla-tube, not exserted; filaments dilated at the base; anthers oblong. Disc prominent, annular. Ovary 1-celled or with an imperfect septum; style filiform; stigmas two, flattened, ovate or elliptic. Capsule usually 1-celled, 4-valved. Seeds 4, glabrous; cotyledons broad, plicate, often bifid.—Prostrate or twining herbs. Leaves usually entire. Peduncles axillary, 1-flowered; bracts foliaceous, usually large.

Species 8 or more, inhabiting the temperate and subtropical zones of both hemispheres.

1. **C. hederacea,** *Wall. in Roxb. Fl. Ind. (ed Carey)* ii. 1824, 94 An annual, with slender climbing stems. Leaves long petioled, deltoid-hastate, 1–$1\frac{1}{2}$ in. long, with large spreading or deflexed entire or toothed basal auricles, membranous, glabrous. Flowers solitary; peduncle long, often exceeding the leaves; bracts foliaceous, ovate, obtuse, enveloping the calyx. Calyx glabrous, 3 lin. long; sepals ovate, obtuse or minutely mucronate, the two outer larger than the three inner and rounded at

the base. Corolla broadly campanulate, nearly 1 in. long and broad. Filaments dilated at the base. Ovary oblong, 1-celled. Stigmas lanceolate.—Choisy in DC. Prodr. ix. 434. Hallier f. in Engl. Jahrb. xviii. 111. *C. abyssinica*, Engl. Hochgebirgsfl. Trop. Afr. 347.

Nile Land. Abyssinia: near Mamberke, 5700 ft., *Schimper*, 1357!

Also in India, China, and Japan.

Imperfectly known species.

2. **C. ochroleuca,** *Bojer, Hort. Maurit.* 231. A perennial climber.

Mozamb. Dist. Zanzibar, ex *Bojer.*

Probably not a *Calystegia.*

18. **HEWITTIA,** Wight et Arn.; Benth. et Hook. f. Gen. Pl. ii. 873.

Sepals foliaceous, unequal, outer much broader than the inner. Corolla campanulate, not lobed, 5-angled, plicate. Stamens inserted low down in the corolla-tube; filaments dilated at the base; anthers oblong. Pollen smooth, polyhedral. Ovary hairy, 1-celled with an imperfect septum, 4-ovuled; style filiform; stigmas 2, ovate-oblong. Capsule globose, 4-valved. Seeds dark, glabrous.—A climbing perennial herb, with more or less ovate-cordate leaves and rather small flowers singly or in small clusters, pale yellow or white, with a purple eye.

A single species spread through the tropics of the Old World, reaching Natal and Madagascar.

An earlier name for this genus is *Shutereia*, Choisy in Mém. Soc. Phys. Genève, vi. ii. (1834), 486, *Hewittia*, having been published in 1837 (Madras Journ. Lit. and Sci. v. 22). The earlier name is not adopted, as it is too much like *Shuteria*, a genus of *Leguminosæ*, published by Wight & Arnott in the same year (Prodr. 207), but presumably earlier in the year.

1. **H. bicolor,** *Wight in Madr. Journ. Sci.* v. 22. Stems slender, twining, herbaceous, more or less pubescent. Leaves cordate-ovate, acute or obtuse, base entire or forming a pair of blunt-rounded lobes, sometimes grossly dentate, 2–5 in. long, green and varyingly pubescent on both surfaces; petiole 1–2 in. long. Flowers 1 or few in a dense head, on a long or short peduncle; bracts small, foliaceous, persistent. Calyx more or less hairy, about 6 lin. long; sepals herbaceous, lower portion paler, upper green foliaceous; outer ovate, inner lanceolate. Corolla 1 in. long, yellow, with a purple eye; midpetaline areas densely hairy. Capsule small, subglobose, hairy, 3 lin. in diam.—Benth. in Hook. Niger Fl. 468; Klotzsch in Peters, Reise Mossamb. Bot. 242; Oliver in Trans. Linn. Soc. xxix. 117; Baker & Wright in Dyer, Fl. Cap. iv. ii. 68. *H. asarifolia*, and *H. hirta*, Klotzsch l.c. *H. sublobata*, O. Kuntze, Rev. Gen. ii. 441; Hallier f. in Engl. Jahrb. xviii. 111; Durand & Schinz, Étud. Fl. Congo 203. *H. barbeyana*, Chodat & Roulet in Bull. Herb. Boiss. i. 192. *Convolvulus bicolor*, Vahl, Symb. iii. 25. *C. involucratus*, Willd. Sp. Pl. i. 845; Schum. & Thonn. Beskr. Guin. Pl. 93. *Shutereia bicolor*, Choisy in Mém. Soc. Phys. Genève, vi.

486 ; Hiern in Cat. Afr. Pl. Welw. i. 727. *Aniseia Afzelii*, G. Don, Gen. Syst. iv. 295. *Ipomœa Afzelii*, Choisy in DC. Prodr. ix. 373 ? *I. benguelensis*, Baker in Kew Bulletin, 1894, 69. *I. phyllosepala*, Baker l.c. *I. ? teretistigma*, Choisy in DC. Prodr. ix. 373. *Bonamia Volkensii*, Dammer in Engl. Pfl. Ost-Afr. C. 329.

Upper Guinea. Gambia, *Brown-Lester*, 26 ! Sierra Leone, *Afzelius ! Don ! Scott-Elliot*, 4111 ! Liberia : Cape Palmas, *Vogel*, 14 ! 59 ! Ashanti, *Cummins*, 40 ! Togo, *Kling*, 37. Lagos, *Millen*, 76 ! *Barter*, 20160 ! Abeokuta, *Irving*, 120 ! *Barter*, 3351 ! Cameroons, *Johnston ! Zenker* and *Staudt*, 631 !

Nile Land. Somaliland : Ganane River, *Riva*, 378 ; Web River, near Karanle, *Riva*, 990. Banks of Upper Nile, *Speke & Grant*. Niamniam, *Schweinfurth*; 2953 ! Uganda, *Whyte ! Scott-Elliot*, 7313 ! Ruwenzori, *Scott-Elliot*, 7537 ! British East Africa : Kavirondo, *Whyte !* Kiroruma River, *Gregory !* River Vena, *Kässner*, 111 ! 127 ! Schimba Mountains, *Kässner*, 219 ! Ribe, *Wakefield !* Mombasa, *Riva*, 1748.

Lower Guinea. Gaboon, *Soyaux*, 436 ! *Büttner*, 381. Lower Congo : Kisantu, *Gillet*, 262 ; and without precise locality, *Smith ! Burton !* French Congo : Bata, *Dinklage*, 1189. Angola : Golungo Alto, *Welwitsch*, 6221 ! 6225 ! Ambaca, *Welwitsch*, 6224 ! Bumbo, *Welwitsch*, 6127 ? Loanda, *Gossweiler !*

South Central. Congo Free State : between the Rivers Lubilasch and Lomami, *Pogge*, 1026 ; Nyangwe, *Pogge*, 1150.

Mozomb. Dist. Zanzibar, *Bojer*. German East Africa : Karagwe ; Kagera River, *Bagshawe*, 31 ! Dar es Salem, *Kirk !* Usambara, *Holst*, 490, 527a, 2049 ! *Kässner*, 14 ! Kilimanjaro ; Maranga, *Volkens*, 1389. Portuguese East Africa : Lupata and Shupanga, *Kirk !* Morambala, *Kirk !* Caboceira and Rio de Sena, *Peters*. British Central Africa : Nyasaland, *Buchanan*, 487 ! *Whyte ! Meller !*

Also Natal and Tropical Asia.

19. **MERREMIA**, Dennst. ; Hallier f. in Engl. Jahrb. xvi. 581 (incl. *Operculina*).

Sepals 5, generally subequal, and more or less coriaceous, elliptic or lanceolate, more rarely orbicular, accrescent in the larger species. Corolla campanulate to broadly infundibuliform, often white, sometimes yellowish ; midpetaline areas generally not well defined. Anthers usually twisted above. Pollen not spiny. Ovary 2–4-celled, 4-ovuled ; style and stigma of *Ipomœa*. Capsule with generally valvular, rarely transverse dehiscence. Seeds generally 4, glabrous.—Annual or perennial plants, with generally herbaceous climbing, more rarely prostrate or trailing stems and axillary flowers, solitary or in few- to many-flowered dichasial cymes.

Species about 60, widely spread in the tropics.

I cannot distinguish generically the larger-flowered and fruited species which have been regarded as forming a distinct genus *Operculina*. The transverse dehiscence of the fruit is not general in this small group ; in one of its most typical members, *I. kentrocaulos*, the large capsule splits longitudinally, the valves separating from the central septum, which bears the remains of the style.

Corolla $1\frac{1}{2}$–$2\frac{1}{2}$ in. long.
Sepals $\frac{2}{3}$–1 in. long.
Leaves cordate-ovate, entire . . . . . 1. *M. Turpethum*.
Leaves palmately cut.

Segments entire.
Stem winged . . . . . 2. *M. alata.*
Stem not winged.
Capsule narrowly ellipsoid, $\frac{1}{2}$–$\frac{2}{3}$ in. long . 3. *M. kentrocaulos.*
Capsule ellipsoid-globose, $1\frac{1}{4}$ in. long . . 4. *M. tuberosa.*
Segments grossly dentate . . . . . 5. *M. dissecta.*
Leaves bipinnatisect . . . . . 6. *M. bipinnatipartita.*
Sepals $\frac{1}{3}$ in. long . . . . . 7. *M. pterygocaulos.*
Corolla about 1 in. long (unknown in *M. spongiosa*).
Leaves cordate-ovate . . . . . 8. *M. umbellata.*
Leaves lanceolate-acuminate . . . . . 9. *M. spongiosa.*
Leaves pinnatilobed . . . . . 10. *M. quercifolia.*
Leaves palmate-pinnately 5-lobed . . . . 11. *M. Pes-Draconis.*
Leaves palmately divided.
Segments narrow, linear to lanceolate.
Sepals lanceolate to ovate, acute . . 12. *M. pedata.*
Sepals elliptical, obtuse . . . . 13. *M. palmata.*
Segments broad.
Pedicels and sepals glabrous . . . 14. *M. ampelophylla.*
Pedicels and sepals with long hairs . . 15. *M. pentaphylla.*
Segments pinnatisect . . . . . 16. *M. multisecta.*
Leaves narrowly oblong, with dentate margin . . 17. *M. somalensis.*
Leaves oblong-ovate with irregularly pandurate margins . . . . . 18. *M. gallabatensis.*
Corolla $\frac{1}{2}$–$\frac{2}{3}$ in. long.
Leaves palmately divided . . . . . 19. *M. verecunda.*
Leaves pinnatilobed . . . . . 20. *M. xanthophylla.*
Leaves oblong with tridentate base . . . . 21. *M. tridentata.*
Leaves linear to linear-oblong . . . . . 22. *M. angustifolia.*
Corolla $\frac{1}{3}$ in. long or less.
Leaves pinnatisect . . . . . 23. *M. pinnata.*
Leaves reniform . . . . . 24. *M. emarginata.*
Leaves cordate . . . . . 25. *M. convolvulacea.*

1. **M. Turpethum,** *Rendle.* Stems slender, twining, finely pubescent. Leaves cordate-ovate, entire, acute, 1–2 in. long, finely pubescent on both sides; basal lobes very short, obtuse, entire; petiole 6 lin. long. Flowers solitary in the axils of the leaves; peduncles pubescent, 1–$1\frac{1}{2}$ in. long, articulated at the middle. Calyx $\frac{3}{4}$–1 in. long; two outer sepals, elliptic, obtuse, pubescent, hiding the inner. Corolla broadly campanulate, $1\frac{1}{2}$ in. long, glabrous outside. Stamens half as long as the corolla. Capsule (not seen in African specimens) surrounded by the large tough accrescent sepals, globose, 6–9 lin. long; endocarp thin membranous; seeds typically 4, large, smooth.—*Ipomœa diplocalyx*, Baker in Kew Bulletin, 1894, 71. *I. Turpethum*, R. Br. Prodr. 485. *Operculina Turpethum*, Silva Manso, Enum. Subst. Braz. 16. *Spiranthera Turpethum*, Bojer, Hort. Maur. 226.

Mozamb. Dist. Portuguese East Africa: Zambesi delta, near Vicenti, *Scott!*

Also in Tropical Asia, Australia, Polynesia, and the Mascarene Islands.

2. **M. alata,** *Rendle.* A glabrous climber. Stems stout, hollow, conspicuously 4-winged on the older portions. Leaves large, thinly

papery when dry, up to 5 in. long by 7 broad, palmatisect with 5 more or less elliptic lobes, with bluntish mucronulate apex and tapering base, the median the largest reaching 5 in. long by nearly half as broad, the outermost the smallest more or less deeply and unequally bilobed; veins on the under leaf-face winged and conspicuous, sometimes obsoletely puberulous; petiole stout, narrowly winged, nearly as long as the blade. Peduncle short, 1½ in. or less, few-flowered; bracts deciduous, membranous, bluntly ovate, about 3 lin. long; pedicels stoutly clavate and broadly winged, about 1 in. long. Calyx broadly cup-shaped, glabrous, ¾–1 in. long, and as broad; sepals broadly obovate to orbicular, apex rounded, coriaceous with broad thin subpellucid margins. Corolla white, broadly funnel-shaped, about 2½ in. long and nearly as broad, glabrous, except for a slight hairiness on the upper part of the badly-defined mid-petaline areas. Filaments dilated and hairy at the base, up to 8 lin. long; anthers over 2 lin. long, contorted. Fruit not seen.

Upper Guinea. Gold Coast: Odumassu. *Johnson*, 155! Krobo Plains, *Johnson*, 517! Togo: near Lome, *Warnecke*, 273!

3. **M. kentrocaulos,** *Rendle.* Perennial, glabrous. Stems twining, generally muriculate, sometimes very obscurely, as are also the petioles and peduncles. Leaves membranous, glabrous, 3–6 in. in diam., palmately cut nearly to the base into 5 to 7 lanceolate to oblong-lanceolate, acuminate or acute to subacute segments; veins prominent beneath, impressed above; petiole half as long to about as long as the blade. Peduncle long or short; flowers few or several in a lax cyme; pedicels often 1 in. or more long; bracts minute, deciduous. Sepals oblong, ¾–1⅓ in. long, obtuse to acute, enlarged in the fruit, becoming 6 lin. long, spreading and rigid. Corolla sulphur-yellow, red at the base, funnel-shaped, 2–2½ in. long; lobes bluntly triangular; midpetaline area somewhat conspicuously lined, but not very sharply limited. Capsule narrowly ellipsoid, 6–8 lin. long, 2-chambered; pericarp thin, splitting lengthwise into 4 valves, and bearing the persistent withered style on the septum. Seeds black, glabrous, between 3 and 4 lin. long.—*Operculina kentrocaulos*, Hallier f. in Engl. Jahrb. xviii. 119; Hiern in Cat. Afr. Pl. Welw. i. 730. *Ipomœa tuberosa*, Choisy in DC. Prodr. ix. 362, partly (as to syn. Steud.), and A. Rich. Tent. Fl. Abyss. ii. 67, not of Linn. *Convolvulus kentrocaulos*, Steud. in Pl. Schimp. It. Abyss. ii. 800.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 930

Nile Land. Gallabat: Matamma, *Schweinfurth*, 2137! Abyssinia: by the River Tacazze, *Schimper*, 800! Shoa, *Quartin-Dillon & Petit*, 64! Mittu: Ngama, *Schweinfurth*, 2803! Bongo; Sabbi, *Schweinfurth*, 2670! Moru: Neangara, *Petherick!*

Lower Guinea. Angola: Golungo Alto, near Menha-Lula, *Welwitsch*, 6167! by the River Congo and Sobato Mussengue, *Welwitsch*, 6168! Pungo Andongo! Calundo, *Welwitsch*, 6166! *Mechow*, 157. Malange, *Gossweiler*, 1106 B!

Var. *pinnatifida*, N. E. Br. Lobes of leaves deeply pinnatifid. Bracts usually resembling the leaves, but smaller. Flowers creamy-white; corolla-tube brownish-crimson.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi: near Tete, *Kirk!* British Central Africa: Boruma, *Menyharth*, 1073! Ngamiland: Kwebe Hills, 3300 ft., *Lugard*, 82! Matabeleland; Matlouce, *Holub*, 1497 and 1498!

4. **M. tuberosa,** *Rendle.* A perennial shrub, glabrous, with milky sap. Stems high-climbing, smooth. Leaves as in *I. kentrocaulos;* segments acuminate. Flowers several to many in a lax dichasial cyme on long or longish peduncles; pedicels about 1 in. or less in length; bracts minute, deciduous. Sepals oval to oval-oblong, generally obtuse, but sometimes subacuminate, barely 1 in. long. Corolla funnel-shaped, barely 2 in. long, golden-yellow; limb crenate. Capsule large, elliptic-globose, glabrous, as big as a pigeon's egg or a walnut, 2-celled, generally 2-seeded by abortion; pericarp thin, surrounded by thin large persistent orbicular toughish sepals, $1\frac{3}{4}$ in. long. Seeds large, blackish, hirtulous especially on the angles, $\frac{2}{3}$ in. long, about 7 lin. broad at the base.—*Operculina tuberosa*, Meissn. in Mart. Fl. Bras. vii. 212; Hallier f. in Engl. Jahrb. xviii. 119; Hiern in Cat. Afr. Pl. Welw. i. 730; Henriq. in Bol. Soc. Brot. xvi. 68. *Ipomœa tuberosa*, Linn. Sp. Pl. ed. 1, 160; Choisy in DC. Prodr. ix. 362 partly (excl. syn. Steud.). *I. Mendesii*, Welw. Apont. Phyto-Geogr. 584.

Lower Guinea. Angola: Benguella; in thickets and introduced into gardens in Loanda, *Welwitsch*, 6254! Malange, *Marques*, 35.

Also in the Mascarene Islands, India, and Tropical America.

5. **M. dissecta,** *Hallier f. in Engl. Jahrb.* xviii. 114. Perennial. Stems twining, terete, more or less densely clothed with spreading yellow hairs. Leaves membranous, 3–6 in. in diam., orbicular in general outline, cut down nearly to the base into 7 lanceolate acute irregularly grossly toothed segments; petiole up to about $1\frac{1}{2}$ in. long, hairy. Peduncles long or short, 2–8-flowered; bracts minute, deciduous; pedicels generally $\frac{1}{2}$–1 in. long. Flower buds ovoid-conical. Sepals elliptic-oblong, obtuse, glabrous, about 9 lin. long, rigid and spreading in fruit, reaching 1 in. or more in length. Corolla broadly funnel-shaped, white with a purple throat, $1\frac{1}{2}$–2 in. long, opening in the evening. Capsule globose, glabrous, 6 lin. or more in diam. Seeds large, 3 lin. long, nearly or quite glabrous, dark coloured.—*Ipomœa sinuata*, Ortega, Decades, vii. 84; Choisy in DC. Prodr. ix. 362; Benth. in Hook. Niger Fl. 468. *Convolvulus dissectus*, Jacq. Obs. ii. 4, t. 28; Britten in Journ. Bot. 1894, 171.

Upper Guinea. Fernando Po, *Vogel*, 238!

Now cosmopolitan in the tropics. Probably indigenous only in America.

6. **M. bipinnatipartita,** *Hallier f. in Engl. Jahrb.* xviii. 115. Perennial, glabrous; stem procumbent, with long internodes. Leaves somewhat thick, orbicular or shortly ovate in general outline, $2\frac{1}{2}$–3 in. long, 2–3 in. broad; two lateral segments approximate, bipinnatisect, secondary lobes 6–9 in. long, furnished with large distant teeth; petiole under 1 in. long. Peduncle about as long as the petiole, bearing above the middle the small ovate bracts, which are 2 lin. long. Sepals obovate, very minutely puberulous, 8 lin. long, 6 lin. broad. Corolla

campanulate with very obtuse lobes, white, 2 in. long. Anthers finally spirally twisted. Fruit and seeds unknown.—Hallier f. in Jahrb. Hamb. Wiss. Anst. xv. 41. *Ipomœa bipinnatipartita*, Engl. Jahrb. x. 246.

Lower Guinea. German South-west Africa: near Usakos, 2000–2600 ft., *Marloth*, 1289! near Otymbingue, *Fischer*, 101; and without precise locality, *Luderitz*, 113.

7. **M. pterygocaulos,** *Hallier f. in Engl. Jahrb.* xvi. 552 *and* xviii. 113. Perennial, glabrous, the whole plant often reddish. Stem twining, distinctly winged. Leaves 2–4 in. long and broad, more or less deeply cordate, palmately 3-lobed to the middle or more deeply; median segment ovate more rarely lanceolate, with acute to aristiform apex; lateral segments similar but often unequally bilobed in very varying degree; petiole narrowly winged, shorter than the blade. Peduncles winged, generally 2–4 in. long, rarely less than 1 in.; cymes few- to many-flowered, rarely 1-flowered; bracts small, subulate; pedicels clavate, $\frac{1}{2}$–1 in. long. Buds ellipsoid to ovoid, blunt, densely strigose. Sepals about 4 lin. long, broadly elliptic to orbicular, coriaceous with thin pellucid margin, much imbricated, sometimes minutely cuspidate. Corolla campanulate, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, white or cream with purple throat, sometimes sulphur-yellow; midpetaline areas badly defined, shortly strigose above. Capsule globose, glabrous, barely 6 lin. in diam. Seeds about the size of a pea, grey to blackish, glabrous or shortly strigose on the angles.—Hallier f. in Bull. Soc. Roy. Bot. Belg. xxxvii. 90, and in Engl. Jahrb. xxx. 386; Dammer in Engl. Pfl. Ost-Afr. C. 330; Hiern in Cat. Afr. Pl. Welw. i. 727, with var. *chrysantha* (flowers sulphur-yellow or whitish-yellow); De Wild. Études Fl. Katanga, 116. *Ipomœa pterygocaulos*, Choisy in DC. Prodr. ix. 381; A. Rich. Tent. Fl. Abyss. ii. 71. *I. petersiana*, Klotzsch in Peters, Reise Mossamb. Bot. 239, t. 38. *Convolvulus pterygocaulos*, Steud. in Schimp. Pl. Abyss. ii. no. 630.

Upper Guinea. Sierra Leone: Kukuna, *Scott-Elliot*, 4507 Southern Nigeria; Abokom-Ikura, *Holland*, 256! Cameroons: Yaunde, *Zenker & Staudt*, 630! Fernando Po, *Buchholz*.

Nile Land. Abyssinia: near Mai Dogale, *Schimper*, 630! mouth of the Bahr el Arab, *Schweinfurth*, 1188! Nile banks north of Gondokoro, *Speke & Grant!* Uganda, *Stuhlmann*, 1361, *Scott-Elliot*, 7242! *Whyte!*

Lower Guinea. Lower Congo: Stanley Pool, *Hens*, B, 336! Lemba, *Dewèvre*, 365, 10028; Kisantu, *Gillet*, 336 partly, 912. Boma and Bingila, *Dupuis;* and without precise locality, *Smith!* Angola: Golungo Alto, *Welwitsch*, 6143! 6164! 6155! Malange, *Gossweiler*, 1106!

South Central. Congo Free State: Lomami River, *Pogge*, 1212. Katanga, Lukofu, *Verdick*, 586; Kasai Valley, *Descamps*.

Mozamb. Dist. German East Africa: Kondeland, *Goetze*, 1338. Portuguese East Africa: Zambesi delta, *Kirk!* Gazaland, *Wood*, 5763! East of Lake Nyasa, *Johnson*, 131. British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1081! Nyasaland; Tanganyika Plateau, *Whyte!* Shire Valley, *Waller!* and without precise locality, *Buchanan*, 959! 1034! Rhodesia, near Victoria Falls, *Allen*, 39!

Also in Madagascar.

Var. *tomentosa*, Hallier f. in Bull. Soc. Roy. Bot. Belg. xxxvii. 90. Petioles, the lower surface of the leaf-nerves, and peduncles clothed with greyish tomentum.

South Central. Congo Free State : Mtowa, on Lake Tanganyika, *Descamps.*

8. **M. umbellata,** *Hallier f. in Engl. Jahrb.* xviii. 114. Perennial. Stems slender, terete, twining, glabrous or slightly hairy. Leaves cordate-ovate, obtuse to acute, weakly mucronate, 3–6 in. long, 2–3¾ in. broad, puberulous when young, glabrous or pubescent on the slightly prominent nerves when mature ; petioles shorter than the leaf, 1–4 in. long. Peduncle 2–6 in. long ; cymes umbellate, few- or many-flowered ; bracts triangular-subulate, minute, persistent ; pedicels 6–9 lin. long, subclavate. Flower-buds ovoid, subacute. Sepals glabrous, 4–5 lin. long, elliptic to elliptic-ovate, obtuse or minutely mucronate. Corolla funnel-shaped, sulphur-yellow or white, glabrous outside, 1–1⅓ in. long ; midpetaline areas more deeply coloured but not sharply defined. Capsule small, subglobose, glabrous. Seeds velvety.—Dammer in Engl. Pfl. Ost-Afr. C. 330 ; Hiern in Cat. Afr. Pl. Welw. i. 728. *Ipomœa umbellata*, G. Meyer, Prim. Fl. Esseq. 99 ; Choisy in DC. Prodr. ix. 377 ; Benth. in Hook. Niger Fl. 467. *I. primulæflora*, G. Don, Gen. Syst. iv. 270 ; Choisy, l.c. 390.

Upper Guinea. Senegambia, *Leprieur.* Gambia, *Skues !* Sierra Leone: *Don ! Garrett*, 27 ! *Scott-Elliot*, 4324 ! Cameroons, *Bates*, 194 ! *Preuss*, 562 ! Akwa, *Dinklage*, 157. Great Batanga, *Dinklage*, 751. Fernando Po, *Vogel*, 54 ! *Barter*, 1838 ! *Mann*, 85 ! Prince's Island, *Welwitsch*, 6210 ! 6211 ! *Quintas.*

Mozamb. Dist. German East Africa : Masailand, *Fischer*, 299.

Widely spread in Tropical America, and nearly allied to the Asiatic *M. cymosa*, which differs in the shape of the leaf and the larger flowers.

Hallier in Bull. Herb. Boiss. v. 375 distinguishes the West African forms with yellow flowers as var. *occidentalis* from the East African (var. *orientalis*), in which the flowers are said to be white.

9. **M. spongiosa,** *Rendle in Journ. Bot.* 1894, 179. Stems glabrous, prostrate, reaching more than 4 ft. in length in the specimen seen, narrowly winged, as are the petiole and peduncle. Leaves shortly petioled, lanceolate, acuminate, 3–3½ in. long, about 6 lin. broad, light green, glabrous, spongy below ; margin crisped ; petiole 3 lin. or less in length. Peduncle shorter than the leaves, 1¾ in. long, bearing a pair of closely few- (to 5-) flowered monochasial cymes ; bracts membranous, subulate, 1½–5 lin. long. Flower-buds ellipsoid to ovoid, obtuse. Sepals subequal, elliptic, glabrescent, coriaceous, with a thin, brittle border, 3 lin. long. Corolla not seen fully expanded, "white with a rosy tinge, plumose, hirsute," *Welwitsch.* Capsule thin-walled, brittle, about 4 lin. long. Seeds pubescent.—Hiern in Cat. Afr. Pl. Welw. i. 728. *Ipomœa uliginosa*, Welw. ex Rendle in Journ. Bot. 1894, 179. *I. spongiosa*, Rendle, l.c.

Lower Guinea. Angola : Pungo Andongo ; swampy parts of Mutollo, *Welwitsch*, 6169 ! 6169b (=6196b) !

10. **M. quercifolia,** *Hallier f. in Engl. Jahrb.* xviii. 114. Perennial. Stems trailing or twining, minutely muricate as are the

petioles and peduncles. Leaves rather narrowly ovate in outline, apex rounded, obtuse, deeply lyrate-pinnatifid, 1½–2½ in. long., rather thick, upper surface subscabrid, lower prominently veined, with a large elliptic end-lobe and two smaller ascending side-lobes, all irregularly toothed; petiole shorter than the blade, up to 9 lin. long. Peduncle shorter than the leaf, ¾–1 in. long, 1–2-flowered; bracts small, ovate, obtuse; pedicel thickened upwards, about as long as the peduncle. Flower-buds conical. Sepals glabrous, oblong, obtuse, 6–9 lin. long, the two outer shorter than the inner, subelliptic. Corolla broadly funnel-shaped, apparently about 1 lin. long, "orange, variegated with yellow, dark purple at base of tube" (*Welwitsch*). Fruit and seeds not seen.—Hiern in Cat. Afr. Pl. Welw. i. 728.

Lower Guinea. Angola: Pungo Andongo, in sandy thickets near Quitage, on the River Cuije, *Welwitsch*, 6172!

11. **M. Pes-Draconis,** *Hallier f. in Bull. Herb. Boiss.* vi. 537. A herb densely covered except on the upper leaf-face with short yellowish spreading hairs. Stem long, probably prostrate, reaching 1 line in thickness, with internodes up to nearly 1½ in. long. Leaves shortly petioled, palmately-pinnately 5-lobed up to 2½ in. long; lobes linear-acute, the median several times longer than the lateral, up to 2 in. long by 2 lin. broad; lateral lobes 1–8 lin. long, conspicuously reticulately veined on the lower surface; petiole 1½ lin. long. Peduncles axillary, up to 2½ in. long, rigidly spreading with recurved apex; bracts rather larger, ovate-lanceolate, lowest up to 8 lin. long and half as broad. Cymes subspicate; pedicels very short. Calyx 6 lin. long; sepals ovate-elliptic, subacute, hairy, the inner shorter, glabrous. Corolla broadly funnel-shaped, probably yellow, an inch long and almost as broad; midpetaline areas bearing yellow silky hairs with an apical tuft, but not well defined.

South Central. Congo Free State; Kasai district; by the Lutembue River, a tributary of the Lubudi, *Descamps*.

12. **M. pedata,** *Hallier f. in Engl. Jahrb.* xvi. 552, *and* xviii. 116. Rootstock woody. Stems long, slender, climbing, glabrous above the hairy base. Leaves shortly petioled, glabrous, palmately cut nearly to the base with 5 unequal linear segments, the central ones 1¼ in. long, ½–1 lin. broad. Peduncle as long as the petiole, usually 1-flowered; bracts small, ovate. Calyx glabrous, 6 lin. long; sepals lanceolate, acute, the two outer sometimes ovate, shorter than the inner. Corolla broadly funnel-shaped, 1 in. long, probably white, streaked with purple. Stamens 6 lin. long; filaments subulate, pilose towards the base.—Hallier f. in Bull. Herb. Boiss. vi. 537 (incl. var. *gracilis*). *M. Gregorii*, Rendle in Journ. Bot. 1896, 39. *Ipomœa pedata*, Hochst. & Steud. Pl. Exsicc. No. 948; Choisy in DC. Prodr. ix. 384.

Nile Land. Somaliland: Abdallah, *Keller*, 234. British East Africa: Golbanti, on the lower Tana River, *Gregory!*

Also in Arabia.

13. **M. palmata,** *Hallier f. in Engl. Jahrb.* xviii. 112. Whole plant glabrous. Stems herbaceous, glaucescent, 3–6 ft. long, spreading or climbing. Leaves glabrous, deeply palmately 5-lobed, the two lowest lobes sometimes unequally forked; lobes linear or lanceolate, acute or blunt and mucronate, central one in the upper leaves reaching 2½ lin. long by about 3 lin. broad; in the lower leaves much shorter and broader, according to *Hallier* 1¼ in. long by 8 lin. broad. Petiole shorter than than the leaf, up to about 1 in. long, channelled above. Peduncle 1-flowered, generally longer than the leaf, reaching 3 in.; the portion above the small linear acute bracts thickening upwards, 4–8 lin. long; buds ellipsoidal, obtuse. Sepals elliptic, with a rounded apex; subequal, 4–5 lin. long, glabrous, greenish-yellow, coriaceous, with a membranous edge. Corolla 1 in. long, broadly and shortly funnel-shaped, probably pale yellow; midpetaline areas badly defined, sparsely pubescent above, inconspicuously lined.—Hallier f. in Jahrb. Hamb. Wiss. Anst. xv. 41.

Nile Land. British East Africa: Kibwezi, *Kässner,* 708!

Lower Guinea. Angola: Kakele, on the Chitanda River, *Baum,* 202! German South-west Africa: Damaraland, *Een! Belck,* 52; *Luderitz,* 175. Hereroland; near Otyimbingue, *Fischer,* 105.

Mozamb. Dist. Rhodesia: Bulawayo, *Rand,* 128! 129! 364!

14. **M. ampelophylla,** *Hallier f. in Engl. Jahrb.* xviii. 115. Stems long, striate, flattened, contorted, furnished with yellow hairs principally at the nodes, as are also the petioles and bases of the peduncles. Leaves glabrous, shortly petioled, up to 2 in. long, palmately 7-lobed below the middle; lobes nearly twice as long as broad, central lobe 1¼ in. long, rounded or subemarginate, minutely dentate, ending in a reflexed curved mucro; secondary nerves prominent; petiole barely ½ in. long. Peduncle 1–2-flowered, about 1 in. long; bracts minute, glabrous, lanceolate; pedicels glabrous, clavate, about 4 lin. long. Flower-buds conical, acute. Sepals cartilaginous-membranous, pallid, ovate, lanceolate, acute, glabrous, the inner barely 6 lin. long, the outer shorter. Corolla probably white, tubular-funnel-shaped, 1¼ in. long; midpetaline areas obscure.—Dammer in Engl. Pfl. Ost-Afr. C. 330.

Nile Land. British East Africa: Ulu, *Fischer,* 412.

15. **M. pentaphylla,** *Hallier f. in Engl. Jahrb.* xviii. 115. Annual. Stems slender, twining, covered like the petioles, peduncles and pedicels with fine yellowish spreading hairs. Leaves digitate, membranous, sparsely adpressed, pilose; segments 5, elliptic, narrowing to the base, apex acuminate, 2–4 in. long; petiole as long as or longer than the blade. Peduncles generally long but not exceeding the leaf, few- or many-flowered; pedicels ¾–1 in. long, ultimately deflexed. Sepals elliptic-ovate, obtuse, 6 lin. long, densely clothed with the characteristic long spreading hairs. Corolla campanulate-funnel-shaped, white or yellowish, 1 in. long. Anthers finally twisted. Ovary completely 4-celled. Capsule about 6 lin. in diam., enveloped by the

persistent, densely hairy sepals; endocarp rigid, separating as 4 papery valves from the pericarp. Seeds typically 4, brown, glabrous, $2\frac{1}{2}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 728; Capua in Ann. Istit. Bot. Roma, viii. 233. *Batatas pentaphylla*, Choisy, in Mém. Soc. Phys. Genève, vi. 436, and in DC. Prodr. ix. 339; Benth. in Hook. Niger Fl. 465. *Convolvulus pentaphyllus*, Linn. Sp. Pl. ed. 2, 223. *Ipomæa ægyptia*, Linn. Sp. Pl. ed. 1, 162. *I. pentaphylla*, Jacq. Ic. t. 319; Oliver in Trans. Linn. Soc. xxix. 115. *Spiranthera pentaphylla*, Bojer, Hort. Maurit. 226.

Upper Guinea. Senegal, *Roger*, 94! *Dollinger*, 8! *Perrottet!* Sierra Leone, *Smeathman!* *Scott-Elliot*, 4060! 4869! Guinea, *Isert.* Togo, near Lome, *Warnecke*, 275! Lagos, *Millen*, 118! *Rowland!* Northern Nigeria: Nupe, *Barter*, 863!

Nile Land. Eritrea: near Mount Yangous, 1100 ft., *Schweinfurth & Rira*, 598! Assaorta, 3000 ft., *Pappi*, 3112. Barca, *Terracciano & Pappi*, 2730, Keren, *Steudner*, 942. Abyssinia: by the River Taccazze, 3000 ft., *Schimper*, 1429, 2322! Somaliland, *Hildebrandt*, 883a. Kordofan, *Kotschy*, 110! *Pfund*, 153! 521! Soudan: Khartoum, *Schweinfurth*, 799! *Broun*, 21! Kirreh, *Schweinfurth*, 465a; above Khartoum, *Speke & Grant!*

Lower Guinea. Lower Congo: Masansa, *Burton!* Boma, *Dewèvre*, 3; *Dupuis*, *Wilwerth*; Stanley Pool, *Hens*, B, 371; Moanda, *Vanderyst;* Mayombe. *Dupuis;* and without precise locality, *Smith!* Island of St. Thomas, *Don! Moller.* Angola: Mossamedes; in sandy thickets by the River Giraul, *Welwitsch*, 6118! Loango, *Soyaux*, 220!

Mozamb. Dist. Portuguese East Africa: Kaimba Island, opposite Tete, *Kirk!*

Widely spread in the tropics.

16. **M. multisecta,** *Hallier f. in Engl. Jahrb.* xviii. 115. Perennial, glabrous herb rich in latex, branched from the base. Stems several, prostrate, terete, rigid, purplish, 2–3 ft. long. Leaves fleshy, very stiff and brittle, reniform in general outline, 1–$1\frac{1}{2}$ in. long, up to $2\frac{1}{2}$ in. broad, cut down nearly to the base into 5 pinnatisect segments; the lowest pair unequally forked, the largest secondary lobes deeply crenate; petiole as long as or longer than the blade. Peduncles 1–5-flowered, longer than the petiole and sometimes exceeding the leaves, $1\frac{3}{4}$–3 in. long; pedicels subclavate, 6–8 lin. long. Flower-buds ovoid, more or less acuminate; bracts minute, ovate. Sepals subcoriaceous, lanceolate, with a bluntly acuminate apex, barely 8 lin. long, glabrous or with sparsely ciliate margin. Corolla shortly funnel-shaped, about 1 in. long. Capsule globose, glabrous, 4 lin. in diam., 2-celled, cells 1-very rarely 2-seeded. Seeds large for the size of the capsule, pisiform or plano-convex, grey, glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 728.

Lower Guinea. Angola: Mossamedes, *Welwitsch*, 6112! Banks of the River Croque, *Johnston!*

17. **M. somalensis,** *Hallier f. in Ann. Istit. Bot. Roma*, vii. 226. A much branched undershrub, 1–$1\frac{1}{2}$ ft. high. Branchlets glabrous with very minutely rugulose cortex. Leaves rather fleshy, glabrous, linear-oblong, 6–8 lin. long, 1–2 lin. broad, obtuse to subacute, margin dentate, revolute; petiole short. Flowers solitary in the leaf-axils on

short peduncles, sometimes geminate or ternate. Sepals oblong-ovate, acute, the 3 outer densely clothed with long stiffish spreading hairs. Corolla funnel-shaped, $\frac{3}{4}$–1 in. long, yellowish, becoming reddish.—*Convolvulus somalensis*, Vatke in Linnæa, xliii. 517, not of Franch.; Hallier f. in Engl. Jahrb. xviii. 110. *C. hadramauticus*, Baker in Kew Bulletin, 1894, 337. *Ipomœa pentaphylla*, Vatke l.c. 509, not of Jacq. *I. crinigera*, Oliv. in Hook. Ic. Pl. t. 2437.

Nile Land. Somaliland: Wodderi, on the coast plain, *Hildebrandt*, 883, a, 883, b.

Also in Arabia.

The identification of *Convolvulus somalensis*, Vatke, with the Arabian species, *Ipomœa crinigera*, Oliv., is given on the authority of Hallier, who has seen Hildebrandt's specimens at Berlin. Previously (see Engl. Jahrb. xviii. 110) Hallier had suggested, as the result of an anatomical examination of the somewhat imperfect material, that the Somaliland plant might perhaps not be a member of the Order *Convolvulaceæ*.

18. **M. gallabatensis,** *Hallier f. in Engl. Jahrb.* xviii. 113. Leaf (one only present) large, long-petioled, ovate-oblong, acute, subcordate, glabrous, 4 in. long, $2\frac{1}{2}$ in. broad, the sides irregularly pandurately lobed, pale green and scabrid above with prominent veins, glaucescent below and finely rugulose. Peduncle very long, much exceeding the leaf; cyme dense, many-flowered; bracts small, lanceolate, acute, pallid, the lower slightly longer than the sepals. Flowers in two geminate, shortened monochasial cymes; buds ovoid, subacute. Sepals elliptic, equal, coriaceous, pallid, glabrous, about 5 lin. long. Corolla twice as long as the calyx; midpetaline areas clothed with dense yellowish pubescence.

Nile Land. Gallabat: near Matamma, *Schweinfurth*, 2182.

19. **M. verecunda,** *Rendle.* Stems procumbent, rather slender, very thinly puberulous. Leaves deeply palmately 7–9-lobed, glabrous above, thinly pubescent beneath and on the petioles; lobes $\frac{2}{3}$–$1\frac{1}{4}$ in. long, 2–5 lin. broad, varying somewhat in shape, linear-oblong, narrowly oblong-lanceolate or spathulate-obovate, acute or obtuse, weakly apiculate, narrowing to a slender stalk-like base; petioles $\frac{1}{2}$ to a little more than 1 in. long. Peduncles exceeding the petioles, one-flowered, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, sparsely hairy like the stem; bracteoles linear or linear-lanceolate, acute, thinly pubescent, 3–4 lin. long; pedicel 5–8 lin. long, stouter than the peduncle and more densely pubescent. Flower-buds bluntly ovoid. Sepals herbaceous, ovate, obtuse to subacute, about 4 lin. long, pubescent, pale green with 6–7 well-marked purple-brown nerves. Corolla broadly campanulate, about 6 lin. long, 9 lin. broad at the mouth, white with a purple-brown or chocolate centre, glabrous; midpetaline areas not defined. Capsule apparently globose; pericarp very thin; seeds 4, 2 lin. in diam., blackish, smooth, glabrous, ciliate on the angles with minute flattened hairs.—*Ipomœa quinquefolia*, var. *pubescens*, Baker in Dyer, Fl. Cap. iv. ii. 66.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe Hills, 3400 ft., *Mrs. Lugard*, 134! Northern Kalahari Desert, T'Klakane Pits, *Lugard*, 227!

Also in the Kalahari region of South Africa.

20. **M. xanthophylla,** *Hallier f. in Engl. Jahrb.* xviii. 113. Stems prostrate or climbing, herbaceous, subcompressed and angular, clothed, as is the whole plant, with short yellow-brown hairs. Leaves with shallowly cordate base, reaching about $2\frac{1}{2}$ in. long by 2 in. broad in the lower part, pinnately 5–9-lobed; lobes acute or obtuse, the terminal above 1 in. long, the basal much the smallest, minutely hirsute on both faces; nerves light-coloured and prominent beneath; petiole 6–9 lin. long. Peduncle $1\frac{1}{4}$–2 in. long; cymes few-flowered, dense; bracts ovate-lanceolate to lanceolate, acute, 6 lin. long or less, subfoliaceous, hiding the base of the sepals. Pedicels $1\frac{1}{2}$–3 lin. long. Buds ovoid. Sepals coriaceous, elliptic, obtuse, glabrous, 4 lin. long. Corolla funnel-shaped, whitish, 8 lin. long, densely covered with yellow-brown hairs in bud.—*Ipomœa xanthophylla*, Hochst. in Schimp. Pl. Abyss. No. 432.

Nile Land. Abyssinia: Uschan, 5000–6000 ft., *Schimper*, 2099; and without precise locality, *Schimper*, 432!

21. **M. tridentata,** *Hallier f. in Engl. Jahrb.* xviii. 116. Glabrous; stems slender, prostrate, Leaves numerous, small, very shortly stalked, hastate-oblong to subquadrate, 9 lin. or less in length, apex obtuse, emarginate and mucronulate to tridentate. Peduncles 1-flowered in African specimens, a little longer than the leaf, forming a slightly thickened pedicel above the minute ovate bracts. Sepals oblong, apex rounded, shortly cuspidate, 2–$2\frac{1}{2}$ lin. long, the outer slightly the shorter. Corolla yellow, about 6 lin. long. Capsule not seen in African specimens, globose, glabrous, about 3 lin. in diam. Seeds dark, glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 729. *Ipomœa tridentata*, Roth in Römer, Archiv. Botan. i. iii. 38; Choisy in DC. Prodr. ix. 353; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 205.

Lower Guinea. Angola: Pungo Andongo; sandy banks of the River Cuanza, near Condo, *Welwitsch*, 6190!

Also in India.

22. **M. angustifolia,** *Hallier f. in Engl. Jahrb.* xviii. 117 (*incl. var. ambigua*). Annual, glabrous. Stems prostrate, then twining, very slender. Leaves linear, obtuse, mucronate, 1–3 in. long, varying very much in breadth, generally from 1–2 lin., rarely broader, with small toothed hastate basal auricles. Peduncle very slender, 1–$1\frac{1}{2}$ in. long., 1–3-flowered; pedicels thickened, subclavate, shorter than the peduncle; bracts minute, lanceolate, acute or cuspidate, persistent. Flower-buds elliptic-ovoid. Sepals oblong to ovate-oblong, obtuse rarely subacute, cuspidate, glabrous, 2–$2\frac{1}{2}$ lin. long, the two outer slightly shorter than the inner. Corolla pale yellow, funnel-shaped, 6–8 lin. long and broad. Capsule globose, glabrous, 3 lin. in diam. Seeds glabrous.—Wildem. & Durand in Bull. Herb. Boiss. 2 sér. i. 37; Hiern in Cat. Afr. Pl.

Welw. i. 729; Henriq. in Bull. Soc. Bot. Brot. xvi. 68; Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 91. *M. hastata*, Hallier f. in Engl. Jahrb. l.c. as to the African specimens; Dammer in Engl. Pfl. Ost-Afr. C. 330. *Ipomœa angustifolia*, Jacq. Ic. Rar. t. 317. *I. filicaulis*, Choisy in DC. Prodr. ix. 353, partly, not of Bl.; Benth. in Hook. Niger Fl. 466; Klotsch in Peters, Reise. Mossamb. Bot. 239. *I. convolvuloides*, Schinz in Verhandl. Bot. Ver. Brandenb. xxx. 273.

Upper Guinea. Senegal: *Perottet*, 503! Gambia, *Skues!* Sierra Leone; near Mahela, *Elliot*, 4052! Whydah, *Don!* Liberia: Cape Palmas, *Vogel*, 55! Gold Coast: Accra, *Don! Vogel! Brown*, 350! Cape Coast, *Brass!* Prampram, *Krause*. Togo, Lome, *Warnecke*, 35! Lagos: Lokuja and Abeokuta, *Migeod!* and without precise locality, *Millen! Macgregor*, 375! 379! Northern Nigeria; Nupe, *Barter*, 1266! Quorra (Niger) River, *Vogel*, 112!

Nile Land. Kordofan, Kohn Mountains, *Kotschy*, 251! Jur: Jur Ghattas, *Schweinfurth*, 1869! Abyssinia, *Schimper*, 1195. Uganda, *Scott-Elliot*, 7217!

Lower Guinea. Island of St. Thomas, *Don! Mann*, 1103! Loango, *Soyaux*. Lower Congo region; various localities, *Smith! Burton! Dewèvre*, 37; *Naumann, Dupuis, Phillips, Cabra, Descamps, Gillet*, 724, 1087; *Butaye, Hens*, A, 16, *Vanderyst*. Angola: Loanda, *Welwitsch*, 6246! 6247! *Gossweiler*, 214! Ambaca, *Welwitsch*, 6203! Huilla, *Welwitsch*, 6122! Ambriz, *Monteiro!* Havungu River, *Baum*, 479! Amboland, *Schinz*.

South Central. East Angola: between Luachim River and Quihumbo, *Marques*, 311. Nindi River Plateau, 3000–4000 ft., *Serpa Pinto*. Congo Free State: Upper Marungu, *Debeerst*.

Mozamb. Dist. German East Africa: near the Umba River, *Thomson*, 14! *Kässner*, 71! Kilimanjaro, *Smith!* north of Lake Nyasa, *Thomson!* Bonda, *Bohm*. Portuguese East Africa: coast of Lake Nyasa, *Johnson*, 14! Rios de Sena, *Peters;* Sena, *Kirk!* Zambesi Delta; Kongoni River, *Kirk!* Vicente, *Scott!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1077! Nyasaland, *Buchanan*, 1420! *Whyte!* Rhodesia; Bulawayo, *Rand*, 130! Ngami-land; Botletle Valley, *Lugard*, 207! Kwebe Hills, *Mrs. Lugard*, 133!

Var. *alatipes*, Rendle. Glabrous or upper leaf-face obscurely pilose. Stem faintly winged. Leaves narrowly linear to narrowly linear-lanceolate, obtuse to acute, mucronulate, base auricled; lobes descending, acute, sometimes obscurely denticulate. Pedicels narrowly winged. Outer sepals obtuse, mucronate, with conspicuously crisped margin, $2\frac{1}{2}$–3 lin. long, the inner $3\frac{1}{2}$ lin. long.—*M. alatipes*, Dammer in Engl. Pfl. Ost-Afr. C. 330 incl. form *angustifolia*.

Nile Land. British East Africa: between Mombasa and Lamu, *Whyte*. Nyika Country, *Wakefield!*

Mozamb. Dist. German East Africa: near Bote, Umba River, *Kässner*, 96! Amboni, *Holst*, 2828. Portuguese East Africa: Lower Zambesi, *Carvalho*.

The larger outer sepals suggest *M. medium* (*Aniseia medium*, Choisy), but the difference from the inner sepals is less exaggerated, they are not cordate, and do not become greatly enlarged in fruit.

Var. *pubescens*, Rendle. Pubescent. Leaves linear-oblong, very obtuse, mucronulate, base with conspicuously dentate auricles; $1\frac{1}{3}$ in. long by 4 lin. broad. Peduncles single-flowered, slightly exceeding the leaves. Sepals oblong, puberulous, shortly acute, subequal, 3 lin. long. Corolla 8 lin. long.

Nile Land. British East Africa: Mombasa, *Scott!*

Mozamb. Dist. Zambesi, *Webb!* between Vicente and the Quagua, *Scott!*

The type also occurs in South Africa, and is probably not separable from the Tropical Asiatic and Australian *M. hastata*, Hallier f. (= *Ipomœa denticulata* R. Br.).

23. **M. pinnata,** *Hallier f. in Engl. Jahrb.* xvi. 552 *and* xviii. 116. Annual. Stems slender, trailing or twining, pubescent with soft spreading hairs. Leaves sessile, more or less hairy like the stem, resembling those of *Quamoclit vulgaris*, pinnate, about 1 in. long, with 8–10 pairs of entire linear segments spaced out on the rhachis. Peduncles short, about as long as, or longer than the leaf, 1–3-flowered; pedicels very short; bracts linear, resembling the leaf-segments. Calyx covered with the characteristic hairs, about 2 lin. long; sepals subcoriaceous, elliptic, with the apex drawn out into a long point, the two inner much smaller. Corolla narrowly funnel-shaped, yellow, scarcely exceeding the calyx. Anthers ultimately slightly twisted. Ovary densely hairy, 4-celled, 2 ovules in each cell. Capsule small, globose, hairy, 3 lin. in diam. Seeds glabrous.—Hallier f. in Engl. Jahrb. xxx. 386; Dammer in Engl. Pfl. Ost-Afr. C. 330. *Ipomœa pinnata*, Hochst. in Kotschy, It. Nub. No. 262; Choisy in DC. Prodr. ix. 353; Schweinf. Beitr. Fl. Aethiop. 96; Oliver in Trans. Linn. Soc. xxix. 116, t. 79.

Upper Guinea. Senegal: Mbidjem, *Thierry*, 18! and without precise locality, *Perrottet*, 510! *Heudelot*. Gambia: *Ingram! Brown-Lester*, 79! Sierra Leone: near Kitchom, *Scott-Elliot*, 4337! Northern Nigeria: Jeba, *Barter!*

Nile Land. Kordofan, *Kotschy*, 262! *Pfund*, 395! Sennar, *Kotschy*, 242! Helba, *Cienkowsky*. Bongo, *Schweinfurth*, 2551. Madi, in crevices of rocks, *Grant*, 656!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Kagehi, on Lake Victoria, *Fischer*, 418; Kondeland, *Goetze*, 877. Portuguese East Africa: east of Lake Nyasa, *Johnson*, 3! Lower Zambesi, Tete, *Kirk!* near Sena, *Kirk*, 257! British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1092! Nyasaland; various localities, *Whyte*, 342! *Sharpe*, 1901! *Johnson! Kenyon*, 2! *Buchanan*, 157! 178! 1253! *Webb! Bellingham!* Ngamiland; Kwebe, *Lugard*, 248! *Mrs. Lugard*, 176!

24. **M. emarginata,** *Hallier f. in Engl. Jahrb.* xviii. 118. Perennial, with a long woody root. Stems slender, trailing, glabrous or slightly pubescent. Leaves orbicular- or ovate-reniform, $\frac{1}{2}$–1 in. broad, very obtuse, with a broad rounded basal sinus, rarely obscurely 3-lobed; petiole a little shorter or as long as the blade. Flowers 1–2, nearly sessile in the axils of the leaves; buds shortly ellipsoid, blunt. Calyx 2 lin. long; two outer sepals shorter and smaller than the inner, obovately-elliptic, subacute, glabrous; 3 inner obovate, obcordate, obsoletely cuspidate, upper half with long ciliate margin. Corolla tubular-campanulate, scarcely exceeding the calyx, yellow with a dark eye; midpetaline areas well defined. Capsule globose, glabrous, milky, 3 lin. in diam. Seeds 2–4, glabrous, dark brown.—Hiern in Cat. Afr. Pl. Welw. i. 729. *Ipomœa reniformis*, Choisy in Mém. Soc. Phys. Genèv. vi. 446, and in DC. Prodr. ix. 351; Oliver in Trans. Linn. Soc. xxix. 115. *I. cymbalaria*, Fenzl in Flora, 1844, 312. *Evolvulus emar-*

ginatus, Burm. f. Fl. Ind. 77, t. 30, fig. 1. *E. Glechoma*, Welw. Apont. Phyto-Geogr. 589, No. 64.

Nile Land. Nubia: Sennar, *Kotschy*, 63, 193! Near el-Korehr, *Ehrenberg*; Roseires, *Cienkowski*; Gedarif (Gadaret), *Schweinfurth*, 2144! near Fashoda, *Schweinfurth*, 1087! White Nile, *Petherick!* Nuer country, *Speke & Grant!* Uganda: near Lake Elmenteita, 6000 ft., *Scott-Elliot*, 6641! Kavirondo, *Scott-Elliot*, 7062! near Nyanza, *Scott-Elliot*, 7135! Kasamaga, Ruwenzori, 5300 ft., *Scott-Elliot*, 7574!

Lower Guinea. Angola; Loanda, *Gossweiler*, 213! 330! in wooded places nearly dried up after flooding, near Quicuxe, *Welwitsch*, 6149! and near Imbondeiro dos Lobos, *Welwitsch*, 6150!

Also in Tropical Asia.

25. **M. convolvulacea,** *Dennst. Schlüss. Hort. Mal.* 34. Perennial. Stems twining, slender, usually glabrous. Leaves cordate-ovate, $\frac{1}{2}$–$1\frac{1}{2}$ in. long and broad, acute, membranous, usually shallowly palmately 3-lobed, green and glabrous on both surfaces; petiole very slender, as long as the blade. Peduncles $\frac{1}{4}$–2 in. long; flowers solitary or few to many, laxly cymose; pedicels short; bracts minute, deciduous. Flower-buds shortly ellipsoid, very blunt. Calyx glabrous or sparsely pilose, especially at the exposed margins, 2 lin. long; sepals coriaceous, shortly obovate to subquadrate, with a broad retuse shortly cuspidate apex. Corolla yellow, subcampanulate, 4 lin. long; expanded limb rather broader; midpetaline areas well defined, with 5 conspicuous violet lines. Capsule ovoid-globose, glabrous, verrucose, barely 4 lin. in diam. Seeds triquetrous, obsoletely pubescent.—*M. hederacea*, Hallier f. in Engl. Jahrb. xviii. 118, and in Ann. Istit. Bot. Roma, vii. 227; De Wild. & Durand in Bull. Herb. Boiss. ser. 2, i. 37. *Evolvulus hederaceus*, Burm. f. Fl. Ind. 77, t. 30, fig. 2. *Convolvulus flavus*, Willd. Sp. Pl. i. 852. *Ipomœa chryseides*, Ker, Bot. Reg. t. 270; Choisy in DC. Prodr. ix. 382; Wight, Icon. i. t. 157 (*chrysoides*). *I. zebrina*, Perrott. ex Choisy in DC. Prodr. l.c.—*Kudici-Valli*, Rheede, Hort. Malab. viii. t. 27.

Upper Guinea. Senegal, *Roger*, 117! *Perrottet*, 515; *Lelièvre*. Sierra Leone: near Mofari, *Scott-Elliot*, 4433! Northern Nigeria: Nupe, *Barter*, 885!

Nile Land. Kordofan, *Pfund*. Somaliland: River Ganane, *Riva*, 1168! Jur: Wau, *Cummins!* White Nile, *Sabatier*, *Schweinfurth*, 994! *Petherick!*

Lower Guinea. Lower Congo: Stanley Pool, *Hens* B, 43! Love Island, *Büttner*, 386. Kisantu, *Gillet*, 123, 388, 833; and without precise locality, *Smith!*

Mozamb. Dist. British East Africa: Boruma, on the Zambesi, *Menyharth*, 538!

Also in the Mascarene Islands and Tropical Asia.

20. HYALOCYSTIS, Hallier f. in Ann. Istit. Bot. Roma, vii. 227, and in Engl. & Prantl, Pflanzenfam. Ergänzungsheft, i. 63.

Sepals 5, free, unequal, herbaceous, lanceolate, not accrescent. Corolla of medium size, campanulate, blunt and very shortly 5-lobed, the midpetaline areas not indicated. Stamens gradually dilated

towards their insertion, and ciliated with glandular hairs. Disc low, ring-like. Ovary ovoid, 1-celled, 4-ovuled; style undivided, filiform; stigmas 2, spherical. Capsule spherical, indehiscent; pericarp thin-walled, transparent; seed solitary, spherical.—A prostrate, sticky herb, with stalked shortly palmati-lobed leaves. Peduncles axillary, 1–3 flowered.

Endemic and monotypic.

Not seen. Very near *Merremia*, the distinguishing feature being the indehiscent one-seeded capsule.

1. **H. viscosa,** *Hallier f. l.c.* 228. A prostrate herb, densely covered, especially on the branches, leaf-stalks, peduncles, sepals and young shoots, with glandular sticky hairs; branches elongated, up to $1\frac{1}{2}$ ft. long, $\frac{1}{2}$ to 1 lin. thick, almost simple. Leaves reniform-suborbicular in outline, reaching about 1 in. long and broad; lobes very short, rounded, spinous-dentate on both surfaces on the excurrent nerves; the young leaves puberulous, the adult glabrescent, except on the nerves which are yellowish glandular-pubescent beneath, palmately 5–7-nerved; petiole up to 5 lin. long. Peduncle shorter than the petiole, sparsely hirsute with spreading hairs, like the bracts, minute linear bracteoles and sepals; pedicels scarcely exceeding 1 lin. long. Sepals ovate-lanceolate, acute, pale green, 4 lin. long, the 2 outer serrate, the inner smaller, shorter, entire. Corolla 1 in. long and about 9 lin. broad, spreading suddenly from a very short narrow tube, pale dull violet, hirsute with grey spreading hairs. Stamens unequal; anthers linear-sagittate. Ovary and lower part of style densely hairy. Capsule about 3 lin. in diam., pubescent. Seed black, opaque, laxly grey pilosulose.

Nile Land. Somaliland: *Robecchi-Bricchetti*, 339.

21. **LEPISTEMON,** Blume; Benth. et Hook. f. Gen. Pl. ii. 873.

Sepals 5, ovate, subequal. Corolla suburceolate, the broad tube narrowing upwards; limb small, spreading, shortly 5-lobed. Stamens inserted low down in the corolla-tube; filaments short, filiform, springing from the back of five ovate scales, which arch over the ovary; anthers linear-oblong. Disc cupular, truncate. Ovary 2-celled, 4-ovuled; style short, subulate; stigma capitate, 2-lobed. Capsule 4-valved. Seeds glabrous.—Climbing herbs. Leaves broad, entire or lobed. Flowers small, in sessile or peduncled axillary cymes.

Species 5, extending through Tropical Asia to New Guinea and North Australia.

1. **L. africanum,** *Oliver in Hook. Ic. Pl. t.* 1270. Stems wide-climbing, clothed with long spreading pale brown stinging hairs. Leaves cordate-ovate, membranous, acute to obtuse, 2–6 in. long and broad, green and more or less hairy on both surfaces, usually irregularly sinuate, with deltoid lobes; petiole long, deciduously hairy like the stem.

Cymes many-flowered,sessile or shortly peduncled ; pedicels slender,1 in. or less in length ; bracts minute. Calyx ventricose. Sepals ovate to elliptic, obtuse, shortly cuspidate, laxly hirsute on the back to glabrous, 2–3 lin. long. Corolla-tube 6 lin. long, at first subcylindric, white, subcampanulate, becoming ovoid as the ovary expands; limb 6 lin. in diam. Capsule setose except in the upper part, tardily dehiscing, shortly ovoid, coriaceous, 6 lin. long.—Hallier f. in Engl. Jahrb. xviii. 123, xxviii. 30 ; Hiern in Cat. Afr. Pl. Welw. i. 731. *Convolvulus owariensis*, Spreng. Syst. i. 594. *Ipomœa owariensis*, Beauv. Fl. Owar. ii. 41, t. 82. *I. repandula*, Baker in Kew Bulletin, 1895, 113. *Lepistemon lignosum*, Dammer in Engl. Pfl. Ost-Afr. C. 331. *L. owariensis*, Hallier f. in De Wild. Études Fl. Katanga, 112.

Upper Guinea. Gold Coast : Anum, *Johnson*, 817 ! Ashanti : near Prahsu, *Cummins*, 1 ! Togo, *Baumann*, 409. Oware, *Beaurois*. Lagos, *Millen*, 33 ! 68 ! 180 ! *Rowland !* Cameroons : Yaunde, *Zenker & Staudt*, 571 !

Nile Land. Jur : *Schweinfurth*, 1430 ! 2509. Uganda : Usoga, 4000 ft., *Scott-Elliot*, 7195 ! Rwenzori, *Scott-Elliot*, 8098 !

Lower Guinea. Lower Congo : Kisantu, *Gillet*, 940, 1012. Angola : Golungo Alto ; Sobado de Bumba and Mussengue, *Welwitsch*, 6145 ! 6145b !

South Central. Congo Free State : Katanga ; Lukofu, *Verdick*, 435.

Mozamb. Dist. German East Africa : Usambara ; Lutindi, 3000–4000 ft., *Holst*, 3425, 3456 ! Portuguese East Africa : Zambesi, *Kirk !* British Central Africa : Nyasaland ; Shire Highlands, *Kirk !*

A specimen with ripe dehiscing capsules collected by Christian Smith (43) on the Congo may represent another species. The capsules are somewhat larger, nearly 8 lin. in diam., more globose and hirsute to the top.

22. **LEPISTEMONOPSIS,** Dammer in Engl. Pfl. Ost-Afr. C. 331.

Sepals 5, unequal, very accrescent, the 3 outer lanceolate, the 2 inner ovate. Corolla campanulate, shortly 5-lobed. Stamens 5, short, equal ; filaments filiform, springing from the base of fleshy glabrous scales ; anthers linear. Disc cupular, shorter than the ovary. Ovary 2-celled, 4-ovuled ; style simple ; stigma capitate, bipartite. Capsule 2-valved. Seeds granular.

Endemic and monotypic.

Not seen. Very near *Lepistemon*, from which it is distinguished by the shape of the corolla.

1. **L. Volkensii,** *Dammer, l. c.* Stems climbing, densely clothed with reflexed hairs. Leaves cordate, 3-lobed, acuminate, mucronate, up to 4 in. long, by $3\frac{1}{2}$ in. broad, adpressed pilose on both surfaces; petiole $2\frac{1}{4}$ in. long, clothed with reflexed hairs. Flowers in peduncled axillary cymes ; pedicels 2 lin. long, hairy like the petioles. Sepals unequal, the 3 outer lanceolate, acuminate, hirsute on the back, barely 6 lin. long, by a little over 1 lin. broad, the two inner oval, mucronate, more or less glabrous, 4 lin. long by barely 2 lin. broad. Corolla campanulate, white, with green stripes, 9 lin. long. Disc shorter than

the globose ovary. Capsule globose, about 8 lin. in diam., surrounded by the accrescent calyx.—Hallier f. in Ann. Istit. Bot. Roma, vii. 229.

Nile Land. Galla Country: Mons Ciaffa, *Riva*, 568.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu; 5000 ft., *Volkens*, 1229, 2353.

23. **CALONYCTION**, Choisy in Mém. Soc. Genève, vi. 441; Hallier f. in Bull. Herb. Boiss. v. 1026.

Sepals rather cartilaginous, glabrous or with large fleshy spreading bristles, closely adpressed to the corolla-tube, long awned or blunt; equal or the outer shorter. Corolla large, white or lilac, hypocrateriform, rarely campanulate, glabrous. Stamens and styles exserted or included. Ovary glabrous, 2-celled, 4-ovuled; stigma biglobose. Capsule 4-valved, 4-seeded.—Climbing herbs. Leaves thin, herbaceous, generally glabrous, cordate, sometimes angular or palmately 3–9-lobed. Flowers peduncled in the leaf-axils, solitary or in monochasial or dichasial cymes. Pedicels short, thick clavate, containing a copious milky juice, becoming enlarged and fleshy in fruit.

Species 6–7 in the hotter parts of America; two species subspontaneous almost everywhere in the tropics.

Corolla white, hypocrateriform	1. *C. speciosum.*
Corolla lilac, tubular below, becoming funnel-shaped above	2. *C. muricatum.*

1. **C. speciosum,** *Choisy in Mém. Soc. Phys. Genève*, vi. 441, *t.* I. *fig.* 4 (*excl. var. b*). Stems climbing widely, smooth or muricated. Leaves cordate-ovate, long acuminate, apex obtuse, conspicuously mucronate, entire in old world specimens, 4–6 in. long, 3½–5 in. broad, membranous, glabrous; petiole about as long as the blade in the adult leaf. Peduncle about as long as the petiole, 1–6-flowered; flowers generally in a lax cincinnus, rarely dichasial; bracts small, deciduous. Sepals coriaceous, glabrous, elliptic, the three outer abruptly aristate, including the awn about 8 lin. long, the two inner scarcely aristulate, or mucronate. Corolla hypocrateriform, white, expanding at night; tube cylindric, 3–4 in. long, 2–3 lin. in diam., expanded limb 4–6 in. in diam. Capsule large, ovoid, brown, tipped by the persistent woody conical style base, 1 in. long without the mucro. Seeds glabrous, dark brown, 4 lin. long, and as broad.—Choisy in DC. Prodr. ix. 345 (excl. var. β), Hallier f. in Engl. Jahrb. xviii. 153; Hiern in Cat. Afr. Pl. Welw. i. 742; Benth. in Hook. Niger Fl. 465. *C. Bona-nox*, Bojer, Hort. Maur. 227; Hallier f. in Bull. Herb. Boiss. v. 1028. *Ipomœa Bona-nox*, Linn. Sp. Pl. ed. ii. 228. *I. grandiflora*, Lam. Ill. i. 467 as to syn. Rheede.

Upper Guinea. Senegambia, *Leprieur.* Sierra Leone: cultivated near Kambia, *Scott-Elliot*, 4344! and at Falaba, *Scott-Elliot*, 5444! Lagos, *Rowland! Millen*, 88! *Millson!* Southern Nigeria: Old Calabar, *Mann*, 2324! Ibu, *Vogel*, 38! Cameroons: Barombi, *Preuss*, 510! Yaunde, *Zenker & Staudt*, 635!

Nile Land. Gallabat, *Schweinfurth*, 2184.

Lower Guinea. Island of St. Thomas, *Moller*. Gaboon, *Soyaux*, 377. Angola: Golungo Alto, *Welwitsch*, 6147!

South Central. Congo Free State: Luebo River, *Descamps*.

A widespread tropical species.

2. **C. muricatum,** *G. Don, Gen. Syst.* iv. 264. Perennial. Stems wide-climbing, papillose. Leaves distinctly petioled, cordate-ovate, acuminate, ultimately mucronulate, membranous, glabrous, 4–5 in. long and as broad. Peduncle long; flowers 3–6, in a lax dichasial or monochasial cyme; bracts minute; pedicels 1–1½ in. long, much thickened in the fruiting stage. Sepals ovate, acuminate, tapering to a long fleshy point which is shorter in the two inner, keeled, glabrous, about 6 lin. long. Corolla red or lilac, about 3 in. long; tube about 2–2½ in. long, passing gradually into the funnel-shaped limb; expanded limb about 2 in. in diam. Capsule globose, up to 1 in. in diam. Seeds 4, smooth, brown, 5 lin. long.—Hallier f. in Engl. Jahrb. xviii. 154 and in Bull. Herb. Boiss. v. 1044; Hiern in Cat. Afr. Pl. Welw. i. 742. *C. speciosum*, var. *muricatum*, Choisy in DC. Prodr. ix. 345. *Ipomœa muricata*, Jacq. Hort. Schœnbr. iii. 40, t. 323. *I. shirensis*, Baker in Kew Bulletin, 1894, 74, not of Oliv. *I. Kirkii*, Britten in Journ. Bot. 1894, 85. *Convolvulus muricatus*, Linn. Mant. 44.

Upper Guinea. Gambia, *Ingram!* Sierra Leone: Mahela, *Scott-Elliot*, 4074! Lagos, *Dawodu*, 257!

Nile Land. Bongo, *Schweinfurth*, 2501! Cultivated at Khartoum, *Schweinfurth*, 288!

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 6146!

Mozamb. Dist. German East Africa: Rovuma Bay, *Kirk!* British Central Africa: Nyasaland; Upper Shire Valley, *Kirk!* Shire Highlands *Buchanan*, 391!

Also in the Cape Verde and Mascarene Islands, Tropical Asia and Tropical America.

24. **ASTROCHLÆNA,** Hallier f. in Engl. Jahrb. xviii. 120.

Sepals elliptic to lanceolate or ovate, generally more or less acute, subequal or the inner shorter and narrower. Corolla funnel-shaped, lilac-purple or violet, or white with a purple eye. Stigmas oblong. Capsule 4-valved. Seeds 4, hairy.—Herbs growing erect from a stout persistent rootstock, sometimes shrubby; stems sometimes trailing; the whole plant, or the younger portions covered with stellate hairs.

Species 19. Endemic; chiefly East African.

Flowers solitary or in 2- to several-flowered cymes, often umbellate or corymbose, not crowded in heads.	
Corolla less than 1 in. long.	
Peduncle 1- to several-flowered; leaves ovate or elliptic; corolla 9 lin. long	1. *A. lachnosperma.*
Peduncle many-flowered; leaves rhomboid; corolla 7 lin. long	2. *A. solanacea.*

Corolla 1–2 in. long.
Leaves ovate-cordate.
Sepals ovate-lanceolate; cymes few-flowered . 3. *A. Volkensii.*
Sepals elliptic; cymes 1- to 3-flowered . . 4. *A. involuta.*
Sepals oblong-lanceolate; cymes 1- to 2-flowered 5. *A Phillipsiæ.*
Leaves ovate.
Corolla about 1 in. long . . . . . 6. *A. engleriana.*
Corolla more than 1 in. long (generally $1\frac{1}{2}$–2 in., but see *A. Stuhlmanni,* var. *parviflora*)
Base of leaf rounded . . . . . 7. *A. malvacea.*
Base of leaf various, but scarcely rounded . 8. *A. Stuhlmanni.*
Leaves oblong to ovate-oblong.
Flowers solitary; sepals nearly 6 lin. long . 9. *A. floccosa.*
Flowers in pairs; sepals 3 lin. long . . . 10. *A. Kæssneri.*
Leaves broadly elliptic, with cuneate base, repand above . . . . . 11. *A. Grantii.*
Leaves broadest above the middle.
Leaves obovate with cuneate base.
Flowers solitary . . . . . 12. *A. ugandensis.*
Flowers cymose . . . . . 13. *A. Whytei.*
Leaves oblanceolate.
Corolla 1 in. long . . . . . 14. *A. annua.*
Corolla 2 in. long . . . . . 15. *A. hyoscyamoides.*
Corolla 4 in. long, hypocrateriform . . . . 16. *A. tubiflora.*
Flowers crowded in heads.
Leaves longer than broad; the subtending leaf carried up on the peduncle.
Leaves spathulate . . . . . 17. *A. melandrioides.*
Leaves ovate-lanceolate with subcordate base . 18. *A. cephalantha.*
Leaves broadly lanceolate, narrowed to the base . 19. *A. polycephala.*
Leaves as broad as long; peduncle free from the subtending leaf . . . . . 20. *A. delamereana.*

1. **A. lachnosperma,** *Hallier f. in Engl. Jahrb.* xviii. 121. Perennial. Stems erect, 1–$1\frac{1}{2}$ ft. long, clothed with whitish stellate tomentum. Leaves ovate to broadly ovate-elliptic, obtuse to subacute, entire or slightly repand, broadly rounded or subcuneate at the base, thin, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{1}{4}$–3 in. broad, clothed thinly above, more thickly beneath with whitish stellate tomentum; petiole 1–2 in. long. Flowers solitary or several umbellately arranged; peduncles about 3 lin. long. Sepals ovate, subacute, 3–4 lin. long, tomentose like the stem. Corolla funnel-shaped, up to 9 lin. long; tube purple; limb light-coloured, glabrous; midpetaline areas strongly defined. Capsule globose, 3–4 lin. in diam., pale brown, glabrous, with 4 brittle valves. Seeds villous.—Capua in Ann. Istit. Bot. Roma, viii. 233. *Ipomœa lachnosperma,* Choisy in DC. Prodr. ix. 356; Vatke in Linnæa, xliii. 510; Schweinf. Beitr. Fl. Aethiop. 95.

Upper Guinea. Northern Nigeria: Kuka, *Gosling*! Bornu, *Oudney!*

Nile Land. Eritrea: Hababb, 5000 ft., *Hildebrandt,* 504! Keren, *Steudner,* 953. Assaorta, *Terracciano & Pappi,* 27, 49; Amasen, *Terracciano & Pappi,* 120. Kordofan, *Kotschy,* 260! *Pfund,* 89! 508! Abyssinia, 4000–5000 ft., *Schimper,* 198! 550.

Mozamb. Dist. British Central Africa: Nganiland; Kwebe Hills, *Mrs. Lugard*, 91 !

2. **A. solanacea,** *Hallier f. in Engl. Jahrb.* xviii. 121. Stem erect, simple, like the rest of the plant floccose with short stellate pubescence. Leaves distinctly petioled, rhomboid, up to 3 in. long, more than half as broad, entire in the lower half, pandurately lobed above the middle, apex rounded, suggesting *Solanum nigrum* in form; petiole about 9 lin. long. Flowers about 6 together in crowded subumbellate cymes; peduncle reaching to the middle of the leaf-blade; pedicels short, about 3 lin. long; bracts small, linear. Sepals narrowly lanceolate, acute, the outer about 4 lin. long, tomentose on the back. Corolla small, about 7 lin. long, glabrous, pale rose-colour. Capsule glabrous, 4-valved, 2-celled, 4-seeded. Seeds black, covered with a fine shining velvet.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, *Stuhlmann*, 3793.

South Central. Congo Free State: Mtowa, by Lake Tanganyika, *Descamps.*

3. **A. Volkensii,** *Dammer in Engl. Pfl. Ost-Afr. C.* 331. Stem erect, $1\frac{1}{2}$–$2\frac{1}{2}$ ft. long, tomentose with stellate hairs. Leaves cordate-ovate [or base sometimes entire], mucronate, $1\frac{1}{2}$ in. long, $1\frac{1}{4}$ in. broad, [sometimes reaching $3\frac{1}{2}$ by 3 in.], clothed with stellate hairs on both surfaces, densely so beneath; petiole $\frac{1}{2}$ in. long. Flowers in few-flowered axillary cymes; peduncles generally from $\frac{3}{4}$–$1\frac{1}{3}$ in. long, like the pedicels and calyx stellately tomentose; pedicels 4 lin. long [reflexed in the fruit]. Sepals ovate-lanceolate, 3–4 lin. long. Corolla funnel-shaped, violet, with purple throat, $1\frac{1}{3}$ in. long. Stamens unequal. Stigmas oblong. [Capsule globose, pale brown, 4 lin. in diam.; pericarp brittle; seeds 4, blackish, very shortly pubescent].

Nile Land. Eritrea: Ginda Valley, 3000 ft., *Schweinfurth & Riva*, 2237 ! Soudan: Khor-neweh-Chak-Chak, *Broun !* Jur: Kurshook Ali, *Schweinfurth*, iii, 4 ! Uganda: South-west of Lake Rudolph, *Wellby !*

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 3500–4000 ft., *Volkens*, 2120.

I have not seen an authenticated specimen of this species, and make the above determinations with some hesitation. The parts enclosed in [ ] in the description refer to the added determinations.—*A. B. R.*

4. **A. involuta,** *Rendle in Journ. Bot.* 1901, 59. An undershrub, with rigid flattened laxly leafy branches, the whole plant clothed with dense whitish stellate pubescence. Leaves shortly petioled, cordate-ovate, up to $1\frac{1}{4}$ in. long, 9 lin. broad, densely stellate-pubescent on both surfaces, veins raised on the lower surface; petiole less than 6 lin. long. Flowers in shortly peduncled axillary 2–3-flowered cymes; peduncles about 1 in. long or less; bracts minute, ovate, caducous; pedicels up to 6 lin. long. Sepals unequal; the two outer elliptic, obtuse, 4 lin. long by 3 lin. broad, stellate-pubescent and prominently pinnately veined on the back, glabrous and green on the inside; inner shorter

and narrower. Corolla funnel-shaped, about 1 in. long; tube deep purple, 8 lin. long by 2 lin. in diam.; limb pale rose-colour, glabrous, with well-defined midpetaline areas. Filaments unequal, 2–4 lin. long. Style 6 lin. long. Fruit and seeds unknown.

Nile Land. British East Africa: near Lake Marsabit, *Delamere!*

5. **A. Phillipsiæ,** *Rendle.* A sarmentose perennial stellately tomentose herb. Stems clothed with stellate white hairs. Leaves petioled, broadly cordate-ovate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long and broad, entire, thinly tomentose on the face, densely clothed with white tomentum on the back; petiole shorter than the blade. Flowers solitary or in pairs in the axils of the leaves on a short peduncle. Sepals subequal, narrowly ovate-oblong, 4 lin. long, less than $1\frac{1}{2}$ lin. broad, obtuse, markedly keeled, much imbricate, densely tomentose. Corolla lilac, $1\frac{1}{4}$ in. long; tube oblong, 9 lin. long and nearly 3 lin. in diam.; limb spreading, $1\frac{1}{4}$ in. in diameter. Stamens unequal. Style shorter than the longer stamens, with oblong spreading lobes.—*Convolvulus Phillipsiæ*, Baker in Kew Bulletin, 1895, 221.

Nile Land. Somaliland: Golis Range, *Mrs. Lort Phillips!*

A stunted form collected in the same locality has small leaves (up to 9 lin. long and broad), and flowers barely exceeding 9 lin. long.

6. **A. engleriana,** *Dammer in Engl. Pfl. Ost-Afr. C.* 330. Stems erect, clothed with ferruginous stellate pubescence. Leaves ovate, mucronate, rugose, undulate at the margins, thinly clothed with stellate pubescence above, and dense white tomentum beneath, with ferruginous main veins. Flowers in lax long-peduncled axillary cymes; peduncle, pedicels and calyx clothed with ferruginous stellate tomentum; pedicels about 6 lin. long, reflexed in fruit. Sepals elliptic, 4 lin. long, $1\frac{1}{2}$ lin. broad. Corolla about $1\frac{1}{4}$ in. long, probably violet, funnel-shaped with a cylindrical tube 6 lin. long. Stamens unequal; filaments hairy at the base. Stigmas rhomboid.

Nile Land. Soudan: Fazokl, *Kotschy*, 537! Jur: Jur Ghattas, *Schweinfurth*, 1326! Moru: Neangara, *Petherick!* Uganda: Kavirondo, *Scott-Elliot*, 7124! *Whyte!* near Mumias, *Whyte!*

Mozamb. Dist. German East Africa: Usaramo; Magubo, *Stuhlmann*, 7125!

I have seen no authentic specimen of this species, and make the above determinations with some hesitation.—*A. B. R.*

7. **A. malvacea,** *Hallier f. in Engl. Jahrb.* xviii. 121 (*partly*). A robust perennial. Stems erect or ascending or decumbent, herbaceous or woody, more or less densely clothed with short white pubescence. Leaves ovate, entire or repand, 2–5 in. long, rounded at the base, dull green, and slightly pubescent above, matted with whitish tomentum beneath. Peduncles 1 in. or more in length, erecto-patent, 2-5-flowered; pedicels short; bracts minute. Sepals elliptic to ovate, subacute to obtuse, pubescent, 4–5 lin. long, 2–$2\frac{1}{2}$ lin. broad. Corolla funnel-shaped, purple, $1\frac{1}{2}$–2 in. long. Capsule globose, glabrous, 4-valved,

4 lin. in diam. Seeds 4, black, glabrous.—Baker & Wright in Dyer, Fl. Cap. iv. ii. 69. *Breweria malvacea*, Klotzsch in Peters, Reise Mossamb. Bot. 245, t. 37.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk! Stewart!* Expedition Island, *Kirk!* Inhambane and Rio de Sena, *Peters!* 30–40 ft. above the Inagua, Usambusha, *Scott!* British Central Africa: Nyasaland; Blantyre, *Buchanan*, 31!

Also in South Africa.

Var. *epedunculata*, Rendle in Journ. Bot. 1901, 59. Dwarf, tufted. Branches short, 2–6 in. long, crowded. Leaves ovate, small, not exceeding 1 in. in length and a little over 6 lin. in breadth. Cymes sessile, 2- to 4-flowered. Sepals lanceolate to bluntly ovate, barely exceeding 3 lin. long. Corolla bright rose-purple, $1\frac{3}{4}$ in. long, and as broad at the mouth.

Mozamb. Dist. Rhodesia: Salisbury, *Rand*, 511!

Var. *parviflora*, Rendle. Apparently a smaller plant, with leaves less than 2 in. long. Peduncles 9 lin. long or less. Sepals oblong-lanceolate, 3 lin. long. Corolla purplish, $1\frac{1}{4}$ in. long.

Nile Land. British East Africa: Taruma (Duruma?); near Tulpanga, *Kässner*, 437!

Mozamb. Dist. German East Africa: Lower plateau north of Lake Nyassa, *Thomson!*

8. **A. Stuhlmanni,** *Hallier f. in Engl. Jahrb.* xxx. 386. An erect or trailing herb, with the habit of an *Althæa*, and a verbascoid stellate indumentum. Stem stout, simple, floccose, as are the petioles and peduncles, with dense ochraceous indumentum. Leaves ovate, 4–5 in. long, 3 in. broad, obtuse or subacute, entire or more or less repand-dentate, base variable, broadly cuneate, truncate to shallowly cordate, dull green above, with tufts of stellate hairs, densely cinereo-tomentose beneath with ochraceous tomentum on the conspicuous veins. Flowers in few- to many-flowered corymbs forming an ample panicle; peduncles robust, rigid, spreading-erect, longer than the petioles (up to 2 in. long); pedicels short, subumbellate, subclavate, about 4 lin. long; bracts and bracteoles small, cymbiform, caducous. Sepals ovate, obtuse, three outer larger than the two inner, 4–5 lin. long, and about half as broad, cinereo-tomentose on the back. Corolla broadly funnel-shaped, $1\frac{1}{2}$ in. long and 2 in. broad; tube deep purple, limb paler. Filaments unequal, dilated and pubescent at the base, Capsule globose, dirty brown, glabrous. Seeds 4, black, papillose.

Upper Guinea. Northern Nigeria, *Gosling!*

Mozamb. Dist. German East Africa: Ukwere, 150 ft. *Stuhlmann*, 8383; Uluguru foothills, *Stuhlmann*, 8683; east of Mtondwe 1300 ft., *Stuhlmann*, 8279; Mikumi, 1700 ft., *Goetze*, 393. British Central Africa: Nyasaland; Nyika plateau, 6000–7000 ft., *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte!* Milanji, *Whyte*, 108! Chiromo, *Scott-Elliot*, 8689! and without precise locality, *Buchanan*, 72! Rhodesia: Mashonaland, near Umtali, *Cecil*, 35!

Var. *parviflora*, Rendle. Flowers smaller, with ovate to ovate-oblong sepals 3 lin. long. Corolla (withered) apparently not exceeding 1 in. in length.

Nile Land. Uganda: Mpororo, 3000 ft., *Scott-Elliot*, 8044!

9. **A. floccosa,** *Hallier f. in Engl. Jahrb.* xviii. 121. An erect undershrub, 1½ ft. high, clothed with stellate floccose tomentum. Leaves ovate-oblong, subacute, slightly repand, up to nearly 4 in. long, above 3 in. broad; nerves prominent beneath; petiole 1½ in. long. Peduncles 1-flowered, above 1 in. long. Sepals oblong, obtuse, 5 lin. long, 2 lin. broad, Corolla funnel-shaped, 1½ in. long, probably red-purple. Fruit and seeds not known.—*Ipomœa floccosa*, Vatke in Linnæa, xliii. 512.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt*, 2758, ex *Vatke*, 2754, ex *Hallier*.

10. **A. Kæssneri,** *Rendle.* Erect; stem stout, woody, reaching nearly 2 lin. in diam. in the small shoots which comprise the material, densely clothed like the petioles and peduncles with a pale ferruginous floccose tomentum, rather densely leaved. Leaves oblong to ovate-oblong, 2–2¾ in. long, ⅔–1½ in. broad, apex obtuse, base rounded to flat; sparsely stellately hairy above, stellately grey tomentose beneath with prominent floccose subferruginous veins; petiole generally less than 1 in. long. Peduncles axillary, 6–8 lin. long, more slender than the petioles, generally 2–flowered; pedicels barely 6 lin. long, reflexed after flowering. Sepals oblong to ovate-oblong, 3–4 lin. long, 1½ lin. broad, blunt, midrib prominent on the greyish stellate-tomentose dorsal face. Corolla 1¼ in. long, funnel-shaped, purple, tube darker, limb pale, with well-marked areas. Fruit not present.

Nile Land. British East Africa: Saui, *Kässner*, 735!

11. **A. Grantii,** *Rendle.* Stems stout, herbaceous, erect, hollow, about 1½ ft. high, 3 lin. thick, apparently few from a short woody erect rootstock which passes below into the long woody tap-root, covered in the younger portion with a dense subferruginous stellate tomentum which becomes sparser below. Leaves broadly elliptic in outline, 3–4 in. long by 2–2⅓ in. broad, apex blunt, often inconspicuously mucronate, base generally broadly cuneate, margin above the base repand; upper surface sparsely stellate-hairy, lower stellate-pubescent becoming tomentose on the conspicuous nerves; lateral nerves pinnately ascendo-patent; petiole tomentose like the stem, 1 in. or less in length. Peduncle generally long, reaching 3½ in., generally free from the leaf, the latter sometimes carried up a very short way, tomentose like the stem, bearing a subcapitate cyme of generally about 6 flowers suspended by a pair of linear to linear-oblanceolate dorsally pubescent bracts about 7 lin. long. Pedicels short, 3 lin. or less long; bracts shorter and narrower than the leaves. Sepals ovate-lanceolate to lanceolate, acute, 5–6 lin. long, pubescent like the bracts, the inner slightly shorter and glabrescent. Corolla funnel-shaped, purple with lighter limb, about 1¼ in. long, glabrous. Capsule subglobose, erect, about 3 lin. broad; pericarp light brown, brittle. Seeds brown, shortly pubescent.—*A. malvacea*, Hallier f. in Engl. Jahrb. xviii. 121 as to syn. *Convolvulus malvaceus*, Oliv. in Trans. Linn. Soc. xxix. 117.

Nile Land. Uganda: Chopeh, *Speke & Grant!* Kavirondo, *Whyte! Scott-Elliot*, 7126!

Mozamb. Dist. German East Africa: Usui, *Speke & Grant*, 202!

12. **A. ugandensis,** *Rendle.* Stem erect about a foot high, sparsely branched; younger portion stellate-tomentose, hairs white, becoming glabrescent below. Leaves obovate with cuneate base, repand above, up to $2\frac{1}{2}$ in. long by barely $1\frac{1}{2}$ in. broad; apex blunt to obscurely emarginate; both surfaces stellate-tomentose, more densely beneath especially on the veins; petiole short, 3 lin. long or less. Flowers solitary, short-stalked; stalk barely 4 lin. long; a pair of bracteoles arising at the base of the stalk, about 7 lin. long, narrowly linear-lanceolate with involute edges, and densely tomentose on the back. Sepals ovate, acute, dorsally keeled, the 3 outer about 7 lin. long, and almost concealing the slightly shorter narrower inner sepals, dorsally thickened in the middle line above the base. Corolla funnel-shaped, glabrous, $1\frac{1}{2}$ in. long; tube cylindric, a little over 3 lin. in diam., 8 lin. long, pale rose-purple; limb very shallowly 5-lobed, white; midpetaline areas distinctly limited by two nerves on the outside, and suffused with pale rose on the inside. Stamens and style included in the corolla-tube.

Nile Land. Uganda, *Dawe!* Described from a living specimen flowering at Kew.

13. **A. Whytei,** *Rendle.* Shoots herbaceous, leafy; stem hollow, reaching $2\frac{1}{2}$ lin. in diam. 4 in. below the tip, covered like the young leaves, petioles, peduncles and pedicels with grey tomentum, becoming sparser below. Leaves obovate, with cuneate base and repand upper portion, apex blunt to subacute, apiculate, 3–4 in. long, $1\frac{1}{2}$–2 in. broad, thin and membranous when dry, sparsely stellate-hairy on both surfaces, more densely hairy beneath on the subprominent pinnate veins; petiole short, 3–6 lin. long. Peduncles slender, free from the leaf, about 1–$1\frac{3}{4}$ in. or less in length, bearing somewhat laxly few-flowered cymes; lower bracts narrowly lanceolate to linear-lanceolate, acuminate, about 6 lin. long, dorsally pubescent like the sepals; upper bracts filiform; pedicels slender, $6\frac{1}{2}$ lin. or less. Sepals lanceolate-acute, 5–6 lin. long. Corolla about $1\frac{1}{2}$ in. long, funnel-shaped with purple tube and paler (? white) broad limb. Fruit not seen.

Nile Land. British East Africa: between Mombasa and Lamu, *Whyte!* Tara, 1500 ft, *Kässner*, 509!

Near *A. hyoscyamoides*, from which it is distinguished by the broader tops of the leaves and smaller flowers.

14. **A. annua,** *Rendle.* An erect herbaceous annual (a complete specimen is 20 in. in height, with a stem about 2 lin. thick and unbranched, a second specimen consists of a portion of stem, evidently from a much larger plant, nearly 4 lin. in diam., bearing short leafy flowering branches). Stem hollow, terete, younger part clothed with greyish pubescence, becoming glabrescent and scabridulous below. Younger leaves elliptic with tapering ends, becoming oblanceolate to

obovate and obtuse below, and from 3 to 4½ in. long and 1¼–2 in. broad, apex weakly mucronate, margin more or less repand above the base; shortly tomentose on both surfaces when young, sparsely pubescent when older, with shortly tomentose regularly pinnate veins; petioles less than 6 lin. long, hairy like the stem. Peduncle short, about 3 lin. long (fruiting peduncles on the lower part of the stem reach 1¼ in.), bearing few-(generally 3-)flowered cymes; pedicels separate from or very shortly adnate to the subtending leaf, very short, 2 lin. long, reaching nearly 6 lin., but not recurved in the fruit. Sepals ovate to ovate-lanceolate, subobtuse to acute, 3 lin. long, dorsally pubescent like the bracts and young leaves. Corolla funnel-shaped, purple with paler limb, about 1 in. long. Capsule globose, 2⅕ lin. in diam.; pericarp glabrous, brown, brittle. Seeds 4, brown, thinly pubescent.

Mozamb. Dist. German East Africa: Usambara; Muoa, *Kässner*, 55! near Bote (Buiti?), *Kässner*, 93! Gondoona, *Kässner*, 113!

15. **A. hyoscyamoides,** *Hallier f. in Engl. Jahrb.* xviii. 121. A robust, erect, perennial herb. Stems sparsely clothed with whitish stellate hairs below, densely above. Leaves oblanceolate to narrowly elliptic-oblanceolate, 2–4 in. long, subacute, with a long weak mucro, narrowed to the base, margin repand above the middle sometimes with one or two more or less prominent teeth, distinctly petioled, thin, dull green and obscurely stellately pubescent above, densely clothed with soft greyish-white stellate pubescence beneath. Peduncles up to about 1 in. long, stiffly erecto-patent, few-flowered; pedicels short; bracts minute, with dense stellate pubescence like the sepals. Sepals ovate-lanceolate, acute, 4–5 lin. long. Corolla funnel-shaped, about 9 lin. long; tube purple; limb pallid, glabrous. Capsule globose, glabrous, 4 lin. in diam. Seeds rough, sparsely hairy.—*Convolvulus hyoscyamoides*, Vatke in Linnæa, xliii. 520.

Nile Land. British East Africa: Ukamba, *Scott-Elliot*, 6300! between Mombasa and Lamu, *Whyte!* Mombasa, *Hildebrandt*, 1942! *Kirk!* Nyika Country, *Wakefield!*

Mozamb. Dist. Lake Tanganyika, *Cameron!* German East Africa: lower plateau, north of Lake Nyassa, *Thomson!* Umba Valley, *Smith!* Karagwe; Bukoba, *Stuhlmann*, 3851. Usambara; Masheua, *Holst*, 8822! steppes on Ugweno Mountain, *Volkens*, 521!

16. **A. tubiflora,** *Hallier f. in Ann. Istit. Bot. Roma*, vii. 228. A frutescent herb, erect, densely clothed with minute stellate grey-white verbascoid tomentum. Stems up to 16 in. long, robust, erect, unbranched, terete, glabrescent below, and covered with a smooth shiny paper-like cortex. Leaves cordate, acute, 3 in. long and as broad, grossly and bluntly sinuate-dentate, herbaceous, palmatinerved at the base, penninerved above; nerves prominent beneath; petiole nearly as long as the blade. Peduncles axillary, solitary, 1½–7 lin. long, robust, terete; flowers 3–5, umbellate, subtended by a pair of oblong or ovate-lanceolate caducous bracts, up to 9 lin. long, marked on the outside with several rather prominent parallel veins. Bracteoles

minute, linear; pedicels a little longer than the peduncle, subclavate. Sepals herbaceous-membranous, subpellucid, bearing short grey tomentum on the outside and marked with three rather prominent parallel nerves, the two outer ovate-lanceolate, 6 lin. long, three inner larger, 10 lin. long, elliptic-oblong, obtuse or emarginate. Corolla hypocrateriform; tube $4\frac{1}{4}$ in. long, $1\frac{1}{2}$ lin. thick; limb white, a purple zone nearly 6 lin. broad below the limb; midpetaline areas, grey-tomentose outside, plainly defined. Anthers included, linear-sagittate, 3 lin. long. Ovary shortly ovoid, glabrous. Capsule globose, glabrous, concealed in the enlarged sepals, about 6 lin. in diam., 4-valved, 2-celled. Seeds 4, trigonous, covered all over, but especially at the two lateral angles, with short grey-whitish tomentum.

Nile Land. Galla Country: Irma, near the River Daua, on granite rocks, *Riva*, 1469.

Not seen.

17. **A. melandrioides,** *Hallier f. in Engl. Jahrb.* xviii. 122. Stem 6 ft. long, erect, thick, woody, branched upwards, especially in the younger parts softly cinereo-tomentose. Leaves spathulate, about 3 in. long, $1\frac{1}{4}$ in. broad, entire, acute, mucronate, narrowed to the petiole; petiole less than 6 lin. long. Flowers in dense few-flowered peduncled heads, the subtending leaf raised on the peduncle; pedicels very short; bracts broadly ovate-lanceolate, acuminate, subcarinate, ovate, as long as the sepals. Sepals lanceolate, acute, subcarinate, 6 lin. long, $1\frac{1}{2}$ lin. broad. Corolla funnel-shaped, subentire, up to $1\frac{1}{2}$ in. long, white with a deep purple-violet base. Capsule glabrous, 4-valved.

Mozamb. Dist. German East Africa: by the Ugalla River, *Bohm*, 255.

18. **A. cephalantha,** *Hallier f. in Engl. Jahrb.* xviii. 122. Stem erect, clothed, especially towards the top, with long woolly hairs. Leaves shortly petioled, ovate-lanceolate, acute, gradually narrowing towards the subcordate base; petioles up to 8 lin. long. Flowers in very dense long-peduncled (up to $2\frac{1}{2}$ in.) axillary heads; leaves inserted on the lower peduncles much below the middle, on the upper higher, even above the middle; bracts exceeding and enveloping the sepals, broadly ovate-subcordate, long-acuminate, median nerve very prominent on the outside. Outer sepals broadly ovate, acute, 6 lin. long, up to 5 lin. broad. Corolla 2 in. long, $1\frac{1}{2}$ in. broad, similar in form and colour to that of *A. melandrioides*.

Mozamb. Dist. German East Africa: Muansa, south of the Victoria Nyanza, *Stuhlmann*, 4521.

19. **A. polycephala,** *Hallier f. in Engl. Jahrb.* xviii. 122. Nearly allied to *A. cephalantha*. Stem erect, densely hairy. Leaves shortly petioled, broadly lanceolate, entire, acute, narrowed to the base, carried up on the peduncles beyond the middle. Flowers in very dense many-flowered involucrate heads on long lateral peduncles, very numerous at the top of the stem; bracts very broadly ovate, acute,

densely rough woolly outside, with 5–7 subparallel black ribs. Corolla red, glabrous. Capsule glabrous, 4-valved. Other characters but especially the indumentum as in *A. cephalantha*.

Mozamb. Dist. German East Africa: Wadiboma (Kwadiboma ?), *Fischer*, 417.

Distinguished from *A. cephalantha* by the form of the leaf and colour of the ower, and also by the somewhat larger obscurely veined bracts and still coarser indumentum.

20. **A. delamereana,** *Rendle in Journ. Bot.* 1901, 60. Shrubby. Stem robust, densely clothed as are the peduncles and petioles with subferruginous stellate tomentum. Leaves broadly ovate or suborbicular, 2½–4 in. long and broad, apex subobtuse, inconspicuously mucronate, base shallowly cordate, undulate in the margin, stellate-pubescent on both surfaces, more densely beneath; veins prominent beneath and stellately tomentose; petiole ½–1 in. long. Flowers in dense many-flowered heads; peduncles stout, 1–2 in. long, 1 lin. thick, free from the subtending leaf; pedicels under 2½ lin. long; bracts small, oblong-acuminate, caducous. Sepals unequal, about 5 lin. long; 2 outer ovate, subacute, stellate-pubescent, hiding the lanceolate inner ones. Corolla funnel-shaped, nearly 2 in. long, apparently a very pale purple. Filaments 4–6 lin. long. Ovary glabrous.

Nile Land. British East Africa: Cantalla and Hadda, *Delamere!*

Imperfectly known species.

21. **Ipomœa dendroidea,** *Choisy in Mém. Soc. Phys. Genève,* viii. 55. Stem shrubby, terete, branched, clothed like the leaves with yellowish-black stellate pubescence. Leaves linear-lanceolate, entire, obtuse, subsessile, 1–2 in. long, 3–6 lin. broad. Peduncle 1-flowered, very short. Calyx-segments ovate-oblong, obtuse, unequal, 3 lin. long, outer with a median line of stellate hairs, inner glabrous. Corolla funnel-shaped, yellow, scarcely 1 in. long; tube very narrow, glabrous. Capsule glabrous, 4-valved. Seeds like a grain of wheat, clothed with simple red-brown hairs.—DC. Prodr. ix. 356.

Lower Guinea. Angola: *Paris Herbarium*.

Perhaps this is a species of *Astrochlæna*.

25. **QUAMOCLIT,** Tournef. ex Moench, Meth. 453.

Sepals herbaceous, subequal, small, glabrous, obtuse, often mucronulate or appendaged below the tip. Corolla in African specimens hypocrateriform, scarlet, glabrous; limb small. Stamens and style exserted. Ovary glabrous, 4-celled, 4-ovuled. Pollen and stigma of *Ipomœa*. Capsule 4-celled, 4-seeded. Seeds generally glabrous, dark.—Annual climbing herbs, usually glabrous. Leaves entire, lobed or pinnate. Flowers rather small, in lax cymes.—*Ipomœa*, Benth. et Hook. f. Gen. Pl. ii. 870, partly.

Species about 8, in warm and tropical regions, chiefly American. Introduced in Tropical Africa.

Leaves pinnatisect	1. *Q. vulgaris.*
Leaves entire or angulate-lobed	2. *Q. coccinea.*

1. **Q. vulgaris,** *Choisy in DC. Prodr.* ix. 336. Annual, glabrous. Stem slender, twining. Leaves pinnate, 1½–2 in. long, pinnatisect with 8–10 pairs of linear spaced-out segments, all but the lowest simple; petioles slender, shorter than the blade. Peduncles long, generally much exceeding the leaves, 2–3-flowered; pedicels about 1 in. long, thickened in the fruiting stage. Sepals small, oblong, obtuse, mucronulate. Corolla scarlet, hypocrateriform; tube cylindric, 1 in. long; limb patent, 9 lin. in diam. with 5 ovate subacute lobes. Ovary completely 4-celled with 1 ovule in each cell. Capsule ovoid, about 4 lin. high.—Hiern in Cat. Afr. Pl. Welw. i. 743. *Q. pinnata*, Bojer, Hort. Maurit. 224; Hallier f. in Engl. Jahrb. xviii. 154, and in Bull. Herb. Boiss. v. 378. *Ipomœa Quamoclit*, Linn. Sp. Pl. ed. i. 159; Bot. Mag. t. 244.

Upper Guinea. Liberia: Monrovia, *Whyte!* Lagos, *Dawodu*, 85! Southern Nigeria: Sapele district, *Darker!* Fernando Po, *Barter*, 1265! *Mann*, 400! Cameroons: Akwa, *Dinklage*, 153, and without precise locality, *Braun*.

South Central. Congo Free State: Bangala, 1000 ft., *Heus*, C, 130 Leopoldville, *Duchesne*.

Lower Guinea. Prince's Island: by thickets near Baixa de San Antonio, wild, but not indigenous, *Welwitsch*, 6209!

A native of America now widely spread in the Old World.

2. **Q. coccinea,** *Moench, Meth.* 453. Annual, glabrous or sparsely hairy. Stem slender, terete, twining or trailing. Leaves cordate-ovate, acuminate, entire or angulate-lobed, 1½–3 in. long; petioles slender as long as or longer than the leaf. Peduncles about as long as or longer than the leaves, few- to many-flowered; pedicels generally longer than the calyx; bracts minute. Sepals oblong, obtuse, with a subulate appendage, about 3 lin. long. Corolla salver-shaped, scarlet, about 1 lin. long; limb obscurely 5-lobed. Capsule globose, 3 lin. in diam.—Choisy in DC. Prodr. ix. 335; Hallier f. in Engl. Jahrb. xviii. 154; Hiern in Cat. Afr. Pl. Welw. i. 742 partly. *Quamoclit phœnicea*, Choisy l.c. 336. *Ipomœa coccinea*, Linn. Sp. Pl. ed. i. 160. *I. phœnicea*, Roxb. Fl. Ind. ed. Carey, ii. 92.

Upper Guinea. Sierra Leone, *Scott-Elliot*, 3894! 3987! *Johnston*, 63! Gold Coast, *Brown*, 387! Lagos, *Rowland!* Fernando Po, *Mann*, 400!

Lower Guinea. Island of St. Thomas, *Welwitsch*, 6212! *Moller*, 65.

Widely spread in the warmer parts of both hemispheres; a native of Tropical America.

26. IPOMŒA, Linn.; Benth. et Hook. f. Gen. Pl. ii. 870.

Sepals herbaceous or coriaceous, very various in shape, often ovate to lanceolate, or elliptic, obtuse or acute to acuminate or aristate, unequal or subequal, hairy or glabrous, persistent and often much enlarged in fruit. Corolla regular, usually funnel-shaped, rarely salver-shaped

shallowly (rarely deeply) 5-lobed: midpetaline areas well-defined, and often hairy, especially in the young flower. Stamens inserted low down in the corolla-tube; anthers and stigma rarely exserted; filaments filiform, sometimes dilated at the base; anthers ovate-oblong or linear, sometimes spirally twisted when old. Disc annular, entire or sinuate, rarely obsolete. Ovary usually 4-ovuled, 2–4-celled, rarely 6-ovuled, 3-celled; style filiform; stigma capitate, entire, or 2-lobed. Capsule globose or ovoid, usually 4- or 6-valved, rarely splitting irregularly or indehiscent. Seeds glabrous or hairy, 4–6, rarely fewer by abortion; cotyledons broad, plicate.—Herbs or shrubs, usually twining, sometimes prostrate, creeping, rarely erect. Peduncles axillary; flowers 1, few or many in a lax or dense simple or compound cyme; bracts small or large, deciduous or persistent. Flowers large or small, very various in colour, usually white or red-purple.

Species about 400, spread throughout the tropical and subtemperate regions of both hemispheres.

§ 1. CALYCANTHEMUM.—Annual or perennial herbs of very various habit, rarely erect or suberect, often with long trailing branches or climbing. Leaves generally entire with entire or cordate base. Flowers small or moderate, rarely large; sepals herbaceous, ovate or lanceolate, rarely linear, acute to acuminate, rarely obtuse, sometimes broadened and cordate or auriculate at the base. Seeds often pubescent.

Flowers minute. Sepals 2–3 lin. long. Corolla scarcely exceeding the calyx.
Leaves entire.
Leaf-base cordate.
Capsule glabrous.
Stems prostrate . . . . . 1. *I. verticillata.*
Stems climbing.
Peduncle suppressed. Flowers geminate . 5. *I. cynanchifolia.*
Peduncle 1–1½ in. long. Flowers 6–8 in a lax cyme . . . . . 6. *I. Carsoni.*
Capsule hairy.
Sepals acuminate. Corolla purplish . . 2. *I. eriocarpa.*
Sepals blunt. Corolla yellow . . . 4. *I. sulphurea.*
Leaf-base entire (rarely shortly cordate in *I. leucanthemum*).
Corolla white . . . . . 3. *I. leucanthemum.*
Corolla red . . . . . 7. *I. coscinosperma.*
Leaves deeply cut . . . . . 8. *I. kotschyana.*

Flowers small. Corolla less than 1 in. long (see also *I. hackeliana* and *I. cardiosepala*).
Sepals 5 lin. long.
Sepals broadly ovate. Corolla 6 lin. long . . 9. *I. eurysepala.*
Sepals ovate-acuminate. Corolla 8 lin. long . . 10. *I. commatophylla.*
Sepals 3 lin. long.
Sepals bluntly ovate. Corolla 6 lin. long . . 14. *I. curtipes.*
Sepals linear-lanceolate. Corolla less than 1 in. long . . . . . 12. *I. Morsoni.*
Stem climbing, puberulous. Corolla pale red . 11. *I. leptocaulos.*
Stem procumbent, glabrous. Corolla yellow . 13. *I. demissa.*

Flowers moderate, rarely rather large. Corolla exceeding 1 in. in length (except *I. hackeliana* and *I. cardiosepala*).

Sepals 2 lin. long, linear . . . . . 15. *I. recta.*
Sepals 3 lin. long, narrowly ovate . . . . 16. *I. mweroensis.*
Sepals 4–6 lin. long.
Sepals linear or lanceolate.
Corolla 2 in. long . . . . . 17. *I. blepharophylla.*
Corolla 1½ in. long. Flowers solitary. Leaves elliptic-lanceolate . . . . . 18. *I. Debeerstii.*
Corolla 1¼ in. long. Flowers ternate. Leaves ovate or subovate . . . . . 19. *I. Paulitschkei.*
Corolla 1 in. long. Flowers in lax cymes. Leaves oblong-hastate . . . . . 36. *I. hindeana.*
Sepals ovate or ovate-lanceolate (at least the outer) (elliptic in *I. Scotellii*). Corolla generally about 1 in. long.
Flowers not capituliform.
Leaves cordate at the base.
Flowers solitary or geminate.
Stem trailing; sepals ½ in. long . . 21. *I. asperifolia.*
Stem climbing; sepals ⅓ in. long . . 24. *I. hypoxantha.*
Flowers in sessile dichasia . . . 26. *I. Scotellii.*
Flowers in dense (rarely lax) many-flowered, long-stalked cymes . . . . 22. *I. tenuirostris.*
Leaves linear to linear-oblong, narrowed to the base . . . . . 27. *I. Œnotheræ.*
Leaves with truncate or subhastate base . 28. *I. adumbrata.*
Flowers crowded in small heads.
Corolla 1 in. long . . . . . 23. *I. fulvicaulis.*
Corolla 2 in. long . . . . . 25. *I. hewittioides.*
Sepals 9 lin. long, the outer ovate.
Flowers in a head, on rather long peduncles.
Corolla 1¾ in. long . . . . 20. *I. porrecta.*
Flowers solitary. Corolla 2½ in. long . . 29. *I. Randii.*
Outer sepals ovate with a cordate or truncate base.
Stems procumbent.
Sepals 4 lin. long. Corolla a little over 1 in. long . . . . . 31. *I. convolvulifolia.*
Sepals 6–9 lin. long. Corolla 1½–2 in. long . 32. *I. crassipes.*
Stems climbing.
Corolla 8 lin. long . . . . . 30. *I. hackeliana.*
Corolla 2 in. long . . . . . 37. *I. heterosepala.*
Outer sepals with auricled base.
Bracts minute.
Corolla 6–8 lin. long . . . . . 33. *I. cardiosepala.*
Corolla about 1½ in. long . . . . 34. *I. mombassana.*
Bracts foliaceous . . . . . 35. *I. cordofana.*

§ 2. DASYCHÆTIA.—Perennial, prostrate or erect, strigose or woolly plants. Leaves more or less ovate to obovate, entire. Flowers solitary or few, moderate to large. Sepals lanceolate with a long slender tip, densely ciliate or woolly.
Only Tropical African species . . . . . 38. *I. linosepala.*

§ 3. INVOLUCRATÆ.—Climbers, with generally a hairy stem and cordate-ovate hairy leaves. Flowers in a dense head subtended by a leafy boat-shaped bract.
Sepals lanceolate, acute.
Stem finely hairy or glabrescent; sepals glabrescent or sparsely hairy on back . . . . 39. *I. involucrata.*

Stem, leaves, and sepals densely hairy . . . 40. *I. operosa.*
Sepals oblong-spathulate, blunt . . . . . 41. *I. pileata.*

§ 4. CEPHALANTHÆ.—Annual or perennial herbs, low-growing and erect, or climbing, generally hairy. Leaves linear-lanceolate to ovate, or oblong, or orbicular, often cordate, sometimes palmately lobed or partite, hairy especially on the lower surface. Flowers in dense bracteate heads, generally densely hairy. Sepals herbaceous, lanceolate, often resembling the upper bracts. Corolla small, or moderate to large.

Leaves not cordate-ovate.
Leaves linear-lanceolate. Corolla exceeding 1 in. in length . . . . . 42. *I. crepidiformis.*
Leaves elliptic-lanceolate. Corolla less than 1 in. in length . . . . . 43. *I. microcephala.*
Leaves oval narrowing equally at both ends. Corolla a little longer than the sepals . . . . 44. *I. chloroneura.*
Leaves oblong with subcordate base. Corolla 2 in. long . . . . . 45. *I. argentaurata.*
Leaves ovate to oblong. Corolla 1–1$\frac{1}{3}$ in. long . . 46. *I. abyssinica.*
Leaves ovate. Corolla 2$\frac{1}{4}$ in. long . . . . 47. *I. Atherstonei.*
Leaves cordate-ovate, acuminate (subcordate in *I. lasiophylla*).
Bracts foliaceous.
Corolla barely 6 lin. long . . . . . 48. *I. amœna.*
Corolla 1$\frac{1}{2}$ in. long . . . . . 49. *I. velutipes.*
Bracts small, barely exceeding the calyx.
Corolla 1$\frac{1}{2}$ in. long . . . . . 51. *I. chrysochætia.*
Corolla 1 in. long . . . . . 52. *I. lasiophylla.*
Corolla 8 lin. long . . . . . 53. *I. galactorrhœa.*
Leaves suborbicular. Bracts large . . . . 50. *I. chætocaulos.*
Leaves trilobed.
Leaf-base cordate.
Corolla 2 in. long . . . . . 54. *I. elythrocephala.*
Corolla 1–1$\frac{1}{2}$ in. long, rose-red . . . . 55. *I. Wightii.*
Corolla less than 1 in. long, white with purple throat . . . . . 56. *I. garckeana.*
Leaf-base reniform . . . . . 57. *I. whyteana.*
Leaves palmatipartite . . . . . 58. *I. Pes-tigridis.*

§ 5. CHORISANTHÆ.—Annual or perennial herbs with slender climbing hairy stems. Leaves cordate-ovate, sometimes 3-lobed or palmatipartite, hairy, especially on the under surface. Peduncles often long, bearing few, several or many flowers in a dense to lax cyme; bracts generally small. Flowers moderate to large. Sepals herbaceous, lanceolate, acute, rarely exceeding 6 lin. in length, hairy and ciliate. Corolla reddish to purple.

Flowers large. Sepals $\frac{3}{4}$–1 in. long. Corolla 2–3 in. long 59. *I. hederacea.*
Flowers smaller. Sepals 4–6 lin. long. Corolla 1–2 in. long.
Leaves cordate-ovate, entire.
Bracts small, shorter than the sepals.
Hairs on stem white . . . . . 60. *I. erioleuca.*
Hairs on stem yellow . . . . . 62. *I. Kilimandschari.*
Bracts large . . . . . 64. *I. pharbitiformis.*
Leaves cordate-ovate, 3-lobed.
Corolla about 2 in. long . . . . . 61. *I. ficifolia.*
Corolla about 1 in. long . . . . . 63. *I. pilosa.*

Leaves palmately 5–7-partite.
Corolla 6 lin. long . . . . . 65. *I. magnusiana.*
Corolla 9–3 lin. long . . . . . 66. *I. Lugardi.*
Leaves palmately 3-partite . . . . . 67. *I. Eenii.*

§ 6. LEIOCALYX (including § *Batatas*).—Habit various ; plants herbaceous or shrubby, with creeping, prostrate or climbing stems, usually glabrous. Leaves various, often ovate-cordate, or oblong to linear, or palmately cut. Flowers generally small to moderate, sometimes large, axillary or in more or less umbellate dichasia. Sepals usually coriaceous with thinner edges, sometimes verrucose or cristate on the back, oblong or ovate, rarely lanceolate, obtuse (sometimes mucronately) to acute, rarely acuminate (orbicular in *I. pulchella*, spathulate in *I. simonsiana*). Corolla usually bright red or purple, more rarely white. Seeds small. glabrous or shortly hairy.

* Leaves entire (see also *I. Batatas* and *I. leucantha*).
† Stem or branches twining.
Flowers small to moderate, not exceeding $1\frac{1}{2}$ in. in length.
Leaves ovate-cordate, margin entire.
Peduncles 1–3-flowered, to many-flowered in *I. kentrocarpa* and *I. micrantha.*
Corolla pallid with sharply marked purple eye.
Corolla $1\frac{1}{2}$ in. long . . . . 68. *I. kentrocarpa.*
Corolla 1 in. long . . . . 69. *I. obscura.*
Corolla bright yellow with purple tube, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long . . . . . 71. *I. ochracea.*
Corolla concolorous, not exceeding 1 in. long.
Seeds pubescent or velvety.
Capsule not bearing a persistent apical spine . . . . . 70. *I. fragilis.*
Capsule bearing a persistent apical spine . . . . . 73. *I. acanthocarpa.*
Seeds glabrous . . . . . 72. *I. micrantha.*
Flowers many, subumbellate; corolla 1 in. long or less.
Sepals cinereo-pubescent, $2\frac{1}{2}$ lin. long . 74. *I. asclepiadea.*
Sepals glabrous, verruculose, 4 lin. long . 75. *I. britteniana.*
Leaves cordate-ovate, irregularly toothed in the lower part . . . . . 76. *I. Papilio.*
Leaves cordate-ovate, margin coarsely dentate 77. *I. simonsiana.*
Leaves ovate or lanceolate, base cuneate . 78. *I. lapathifolia.*
Flowers larger ; corolla $1\frac{1}{2}$– 3 lin. long.
Flowers solitary.
Leaf-base cordate . . . . . 79. *I. humifera.*
Leaf-base entire . . . . . 80. *I. Barteri.*
Peduncles many-flowered.
Corolla campanulate-funnel-shaped, $1\frac{1}{2}$–2 in. long. Sepals markedly mucronate . 81. *I. fastigiata.*
Corolla funnel-shaped, 2 in. long.
Leaves typically ovate-cordate . . 82. *I. nuda.*
Leaves very variable, never typically ovate-cordate . . . . . 83. *I. hellebarda.*
Corolla funnel-shaped, $2\frac{1}{2}$–3 in. long . . 84. *I. shupangensis.*

†† Stem creeping or prostrate; leaves very variable.
Sepals blunt.
Leaf-apex more or less acute, blade narrowing upwards . . . . . 85. *I. aquatica.*
Leaves with blunt, rounded, or incised apex.
Leaves linear to oblong . . . . . 86. *I. stolonifera.*
Leaves reniform . . . . . 87. *I. repens.*
Leaves generally suborbicular, bilobed or with emarginate apex, base very obtuse or truncate . . . . . 88. *I. biloba.*
Sepals subobtuse to shortly acute. Leaves narrow linear (1½ lin. broad) . . . . . 91. *I. simplex*, var. *obtusisepala.*
Sepals acute. Leaves broadly oblong, base subcordate . . . . . 89. *I. Protea.*
Sepals acuminate.
Leaves oblong to elliptic, base entire . . 90. *I. arenicola.*
Leaves linear to linear-lanceolate . . . 92. *I. Welwitschii.*
** Leaves more or less trilobed; sepals shortly acute.
Corolla campanulate-funnel-shaped, 1½ in. long . 94. *I. Batatas.*
Corolla 9 lin. long . . . . . 95. *I. leucantha.*
*** Leaves palmately divided.
Corolla 6 lin. long.
Divisions of leaf 5, pinnatifid to pinnatisect (serrated only in var. *malvæfolia*) . . 96. *I. dissecta.*
Divisions of leaf 5, elliptic, blunt . . . 97. *I. pulchella.*
Corolla 1 in. long. Flowers solitary . . . 98. *I. quinquefolia.*
Corolla 1½–2½ in. long. Peduncles few- to many-flowered.
Outer sepals not gibbous at the base.
Corolla 1½–2 in. long. Leaf-segments 5, the lowest sometimes unequally bifid to tripartite . . . . . 99. *I. palmata.*
Corolla 1½ in. long. Leaf-segments 7, narrow-linear to lanceolate . . . 100. *I. stellaris.*
Outer sepals gibbous and tuberculate at the base. Leaves biternately pedatisect.
Peduncles 1–3-flowered. Corolla about 2 in. long.
Sepals 4 lin. long, gibbous at the base . 101. *I. dasysperma.*
Sepals 5 lin. long, bicalcarate at the base 102. *I. calcarata.*
Peduncles many-flowered. Corolla 2½ in. long 103. *I. saccata.*
Corolla 4 in. long. Outer sepals toothed at the base 104. *I. odontosepala.*
Corolla 3 in. long. Sepals lanceolate, acuminate 93. *I. bolusiana.*

§ 7. ERIOSPERMUM.—Habit various; plants generally more or less shrubby, with erect, suberect, or climbing stems, and generally more or less hairy. Leaves often ovate with a cordate base, but sometimes oblong, oval, orbicular, rarely lanceolate. Flowers generally large; sepals generally chartaceous or coriaceous, rarely membranous, hairy or glabrous, usually obtuse, sometimes cuspidate, elliptic to orbicular, sometimes ovate. Corolla large, showy, funnel-shaped or salver-shaped. Seeds (where known) long hairy on the angles, or whole surface villous.

* Sepals chartaceous or coriaceous,
† Corolla funnel-shaped or campanulate-funnel shaped.
Sepals 1 in. or more long. Corolla 4–5 in. long.
Sepals hairy.

Leaves oblong, up to 1½ in. broad . 105. *I. prismatosyphon.*
Leaves ovate-suborbicular, over 3 in. broad 106. *I. magnifica.*
Leaves cordate-ovate, up to nearly 5 in. broad . . . . . 107. *I. macrocalyx.*
Leaves broadly-ovate, stalk as long as blade 110. *I. macrosiphon.*
Sepals glabrous.
Leaves elliptic with retuse base . . 108. *I. Hanningtonii.*
Leaves lanceolate with wedge-shaped base 109. *I. dammeriana.*
Sepals about 6 lin. long.
Corolla about 3 in. long.
Flowers solitary or in a simple dichasia.
Leaves cordate-oblong. Bracts narrow 111. *I. verbascoidea.*
Leaves suborbicular to ovate, base shallowly cordate . . . 112. *I. dammarana.*
Leaves elliptic-oblong with broadly rounder or subtruncate base . 113. *I. Bakeri.*
Leaves broadly oval, base cordate. Bracts large . . . . 114. *I. lukafuensis.*
Flowers in a lax cyme.
Leaves broadly elliptical with subcordate base . . . . 115. *I. Wakefieldii.*
Leaves ovate, base subtruncate, bullate on upper face . . . . 116. *I. Grantii.*
Leaves deeply cordate . . . 117. *I. Buchanani.*
Cymes dichotomous, many-flowered.
Leaves cordate-ovate . . . 118. *I. pringsheimiana.*
Corolla about 1½ in. long.
Bracts large and persistent . . . 119. *I. citrina.*
Bracts small.
Flowers springing from the same point 120. *I. brasseuriana.*
Flowers in lax cymes . . . . 121. *I. shirambensis.*
Flowers usually solitary . . . 122. *I. gossypina.*
Sepals 3–4 lin. long.
Leaves entire.
Sepals not markedly unequal.
Flowers few to many. Sepals ovate-lanceolate . . . . . 123. *I. lilacina.*
Peduncle short, 1–2-flowered. Sepals oblong . . . . . 124. *I. hierniana.*
Two inner sepals conspicuously larger than the 3 outer.
Bracts subfoliaceous, 3–4 lin. long . 125. *I. Holubii.*
Bracts small, 1½ lin. or less . . 126. *I. rhodesiana.*
Sepals accrescent, spreading in fruit . 127. *I. shirensis.*
Leaves palmatifid . . . . . 128. *I. digitata.*
†† Corolla hypocrateriform.
Leaves entire.
Sepals ¾-1 in. long.
Sepals nearly 1 in. Corolla-tube about 3½ in. long . . . . . 129. *I. marmorata.*
Sepals ¾ in. Corolla-tube about 2½ in. long 130. *I. grandiflora.*
Sepals 4–6 lin. long.
Corolla-tube about 2¼ in. long . . . 131. *I. lapidosa.*
Corolla-tube 3½–4 in. long. Filaments included . . . . . 132. *I. longituba.*

Corolla-tube 4–5 in. long. Filaments exserted . . . . . 133. *I. stenosiphon.*
Leaves multipartite . . . . . 134. *I. bullata.*
** Sepals membranous.
Corolla less than 2 in. long . . . 135. *I. pyramidalis.*
Corolla over 3 in. long.
Outer sepals not shaggy at the base . 136. *I. Hildebrandtii.*
Outer sepals shaggy at the base . 137. *I. incomta.*

§ 8. XEROPHYTA.—Erect low-growing shrubs with slender stiff woody branches and small reniform hairy leaves. Flowers small. Sepals small, coriaceous, broad, obtuse. Corolla funnel-shaped, 1 in. or less long.

Only Tropical African species . . . . . 138. *I. Donaldsoni.*

§ 9. ARGYROPHYLLÆ.—Erect shrubs; young branches and lower surface of the leaves covered with silvery or white hairs (except *I. argyrophylla*, var. *glabrescens*). Leaves entire, lanceolate to ovate, obtuse, short-stalked. Flowers generally solitary on short axillary pedicels; bracts narrow. Sepals lanceolate, acuminate, silky on the back. Corolla moderate to large.

Near Section *Floriferæ*, which they resemble in the silvery or white indumentum, and the lanceolate silky sepals, but are distinguished by the leaves having an entire base, and the reduced inflorescence.

Leaves ovate . . . . . 139. *I. cicatrosa.*
Leaves narrowly lanceolate . . . . . 140. *I. argyrophylla.*
Leaves suborbicular, obovate or oblong-lanceolate . . 141. *I. adenoides.*

§ 10. FLORIFERÆ.—Erect or climbing shrubs; the whole plant or the younger shoots and leaves, especially their lower surfaces, pubescent, tomentose or silky. Leaves entire, reniform to cordate-orbicular, long-stalked. Flowers in many-flowered dichasial cymes, generally large. Bracts resembling the sepals or narrower (minute in *I. Hartmanni*). Sepals subcoriaceous, generally unequal, lanceolate or linear-lanceolate, acuminate (lanceolate to ovate and acute in *I. Hartmanni*, spathulate in *I. spathulata*), silky, tomentose (*I. chrysosperma*) or hirsute (*I. Hartmanni*) on the back. Corolla generally pallid with a purple tube. Seeds, where known, hairy.

Bracts about as long as the sepals.
Sepals tapering.
Leaves with cordate base.
Bracts and sepals silky on the back.
Indumentum on back of leaves, bracts, and sepals not silvery. Sepals barely exceeding 1 lin. in breadth . . . . 142. *I. kituiensis.*
Indumentum silvery. Sepals up to $2\frac{1}{2}$ lin. broad . . . . . 143. *I. nyikensis.*
Bracts and sepals tomentose on the back . . 144. *I. chrysosperma.*
Leaves with rounded base . . . . . 145. *I. urbaniana.*
Sepals spathulate . . . . . 146. *I. spathulata.*
Bracts minute . . . . . 147. *I. Hartmanni.*
Position doubtful . . . . . 148. *I. Mahoni.*

§ 11. PHYLLOCALYX.—Herbaceous or suffruticose. Stems climbing or trailing, hairy or glabrous. Leaves ovate-cordate, long-stalked, glabrous. Flowers showy, few to several in the axillary peduncles. Bracts large, foliaceous. Sepals large, foliaceous, with well-marked longitudinal veins, ovate, the obtuse apex bearing a short bristle, glabrous, the three outer much larger than the inner.

Corolla $2\frac{3}{4}$–4 in. long . . . . . 149. *I. setifera.*
Corolla $1\frac{1}{3}$–$1\frac{1}{2}$ in. long . . . . . 150. *I. fimbriosepala.*

1. **I. verticillata,** *Forsk. Fl. Ægypt.-Arab.* 44. Annual. Stem branching from the base; branches slender, prostrate, slightly hairy, or glabrescent. Leaves cordate-ovate, obtuse, obscurely mucronate, rarely obscurely trilobed, 1–2 in. long, glabrescent or obscurely pubescent on both sides; petiole slender, as long as or longer than the blade. Flowers 1–2-nate, on short pedicels, lengthening in the fruit, with a pair of minute lanceolate bracts at the base. Calyx 2 lin. long; sepals ovate to lanceolate, shortly acuminate, with fine spreading deciduous hairs. Corolla whitish, subcampanulate, a little longer than the calyx. Capsule globose, glabrous, about 4 lin. in diam. Seeds densely pubescent.—Vahl, Symb. iii. 33; Hallier f. in Engl. Jahrb. xviii. 123. *I. geminiflora,* Welw. Apont. 590; Rendle in Journ. Bot. 1894, 174; Hiern in Cat. Afr. Pl. Welw. i. 731. *I. gnaphalosperma,* Hochst. in Kotschy, Pl. Nub. Exsic. No. 123. *I. Perrottetii,* Choisy in DC. Prodr. ix. 373. *Convolvulus lasiospermus,* Vis. Pl. Ægypt. Nub. 13, t. 1, fig. 2. *I. rumicifolia,* Choisy l.c. 351.; Schweinf. Beitr. Fl. Aethiop. 96.

Nile Land. Soudan: Sedab, *Schweinfurth,* 536! Burri, near Khartoum, *Schweinfurth,* 809! Kordofan, *Kotschy,* 123! Sennar, *Kotschy,* 183! *Cienkowsky.* Eritrea: Shohos; Togodele, *Ehrenberg;* Dalak Islands, *Ehrenberg.* Abyssinia, *Schimper,* 1325.

Upper Guinea. Senegambia, *Perrottet, Leprieur!*

Lower Guinea. Angola: Loanda, near Imbondeiro dos Lobos, *Welwitsch,* 6235 partly! Loanda, *Gossweiler,* 313!

2. **I. eriocarpa,** *R. Br. Prodr.* 484. Annual. Stems long, slender, prostrate or high twining, pubescent. Leaves varying from cordate-ovate to linear-oblong, with cordate to subhastate base, acute, $1\frac{1}{4}$–5 in. long, $\frac{1}{4}$–$2\frac{1}{2}$ in. broad, slightly hairy on both sides chiefly on the veins; petiole 1–2 in. long. Flowers few or many in a dense subsessile cluster; bracts small, lanceolate to subulate, persistent; pedicels sometimes as long as the calyx. Sepals very hairy, 2–3 lin. long, ovate, acuminate, with spreading tips. Corolla 3–4 lin. long, campanulate; white with a purple eye or sometimes rose or purple; midpetaline areas pubescent. Capsule globose, hairy, 2-celled, 4-seeded, $\frac{1}{4}$ in. in diam. Seeds glabrous, finely punctate.—Choisy in DC. Prodr. ix. 369; Vatke in Linnæa, xliii. 513; Hiern in Cat. Afr. Pl. Welw. i. 732. *I. hispida,* Roem. & Schult. Syst. iv. 238; Hallier f. in. Engl. Jahrb. xviii. 123; and in Bull. Soc. Bot. Belg. xxxvii. 92; Dammer in Engl. Pfl. Ost-Afr. C. 331; De Wild. & Dur. Reliq. Dewèvr. 165. *I. ligulata,* Boj. Hort. Maur. 229. *I. sessiliflora,* Roth, Nov. Pl. Sp. 116; Choisy in DC. Prodr. ix. 366. *I. Rogeri,* Choisy, l.c. 381. *I. trematosperma,* Hochst. ex Choisy, l.c. 367. *Convolvulus hispidus,* Vahl, Symb. Bot. iii. 29.

Upper Guinea. Senegambia, *Roger,* 116! *Perrottet,* 519! 520! *Leprieur!* Gambia, *Ingram!* Sierra Leone: *Hart! Scott-Elliot,* 5186! Togo, *Kling,* 174; *Büttner,* 335; *Warnecke,* 253! Dahomey, *Burton!* Lagos, *Rowland! Millen,* 139! 167! Northern Nigeria: Nupe, *Barter,* 1027!

Nile Land. Kordofan, *Kotschy,* 33! 289! Sennar, *Kotschy,* 146! 151! Gallabat: Matamma, *Schweinfurth,* 721! 2142! Abyssinia: *Schimper,* 198!

Bongo: Gir, *Schweinfurth*, 2531! Moru: Neangara, *Petherick!* Uganda, *Wilson*, 120! Semliki; Ruwenzori, *Scott-Elliot*, 8080!

Lower Guinea. Island of St. Thomas, *Don!* Lower Congo, *Burton! Smith! Dewèvre*, 897, *Hens*, A278! Angola: Golungo Alto; Pereira stream, *Welwitsch*, 6144! Queta Mountains, *Welwitsch*, 6231! Canaulo, on the Ambaca road, *Welwitsch*, 6232! River Delamboa, *Welwitsch*, 6196! 6233!

South Central. Congo Free State: Upoto, *Wilworth*. Mtowa, *Descamps*.

Mozamb. Dist. Zanzibar, *Krause*. German East Africa: north of Lake Nyasa, *Thomson!* Portuguese East Africa: near Lake Nyasa, *Johnson*, 396! Zambesi Delta; Vicente, *Scott!* Zambesi, *Webb!* British Central Africa: Boruma, *Menyharth*, 1083! Nyasaland; Shire Highlands, *Buchanan*, 424! between Kondowe and Karonga, *Whyte*, 378!

Also in Madagascar and through Tropical Asia to North Australia.

3. **I. leucanthemum,** *Hallier f. in Engl. Jahrb.* xviii. 124. A much-branched undershrub; branches prostrate or ascending, half-climbing, slender, grey-pubescent. Leaves linear-oblong, 1–2 in. long, green and thinly hairy on both sides, cuneate or rounded or shortly cordate at the base, obtuse, minutely mucronate; petiole very short. Flowers solitary in the axils of the leaves on very short hairy pedicels. Calyx hairy, 3 lin. long; sepals unequal, ovate- or oblong-lanceolate. Corolla funnel-shaped, white, very hairy outside, scarcely longer than the calyx. Stigma with two oblong lobes. Fruit and seeds not seen.—Dammer in Engl. Pfl. Ost-Afr. C. 331. *Calycanthemum leucanthemum*, Klotzsch in Peters, Reise Mossamb. Bot. 244, t. 40.

Mozamb. Dist. Portuguese East Africa: Rio de Sena, *Peters;* Lower Zambesi; near Tete, *Kirk!*

We have no authenticated specimens of Klotszch's species. The sepals in the plant collected by Kirk are much less acute than represented in Klotszch's figure, but the plant agrees in other respects.

4. **I. sulphurea,** *Hochst. ex Choisy in DC. Prodr.* ix. 356. Annual. Stems slender, trailing, pubescent. Leaves entire, bluntly elliptic-ovate, obtuse, 1–2 in. long, usually shallowly cordate, slightly hairy on both surfaces; petiole 3–6 lin. long. Flowers few or many in the axils of the leaves on short pedicels; peduncle almost suppressed. Bracts small, ovate, about 1 lin. long. Calyx hairy, 3–4 lin. long; sepals ovate, blunt, the two inner rather narrower, lower half pale-coloured, upper half green and leaf-like, finally scariose. Corolla not exceeding the calyx, sulphur-yellow; filaments slightly unequal; anthers cordate. Capsule globose, hairy, 3 lin. in diam. Seeds pubescent.—Hallier f. in Engl. Jahrb. xviii. 124. *I. vagans*, Baker in Kew Bulletin, 1894, 70.

Upper Guinea. Senegambia, *Perrottet! Lepriéur!* Guinea, *Isert!*

Nile Land. Kordofan; near Obeid, *Kotschy*, 273! *Pfund*, 47! 59! Abu Harasa, *Pfund*, 148!

5. **I. cynanchifolia,** *C.B. Clarke in Hook. f. Fl. Brit. Ind.* iv. 208 *partly*. Apparently annual. Stem climbing, slender, laxly hispidulose,

12–15 in. long in the Angolan specimens. Leaves petioled, narrowly cordate, acuminate, mucronulate, reaching 2 in. long by 1 in. broad at the base, sparsely pilose on the veins on the lower face; margin ciliolate; petiole slender, to 1½ in. long. Peduncle obsolete; flowers geminate on short pedicels. Calyx barely 3 lin. long; sepals ovate, blunt, the two inner narrower, lanceolate, ciliate. Corolla minute. Capsule globose, cuspidate, glabrous; seeds 4, grey-pubescent.—Hallier f. in Bull. Herb. Boiss. vi. 538; Hiern in Cat. Afr. Pl. Welw. i. 732.

Lower Guinea. Angola: Loanda; near Imbondeiro dos Lobos, *Welwitsch*, 6235 partly! Loanda, *Gossweiler*, 226!

Also in South Africa and Tropical Asia.

6. **I. Carsoni,** *Baker in Kew Bulletin*, 1894, 71. Stem slender, pubescent, wide-climbing. Leaves ovate, entire, deeply cordate, 2–3 in. long, glabrous except for a few hairs on the main veins; petiole pubescent, 1 in. long. Peduncle pubescent, 1–1½ in. long; flowers 6–8 in a lax cyme; pedicels 3–6 lin. long; bracts minute. Calyx 2 lin. long; sepals hairy, lanceolate. Corolla very small. Capsule globose, 2 lin. in diam. Seeds dull brown, glabrous.—Dammer in Engl. Pfl. Ost-Afr. C. 333.

Mozamb. Dist. British Central Africa: Fwambo, south of Lake Tanganyika, *Carson!*

7. **I. coscinosperma,** *Hochst. ex Choisy in DC. Prodr.* ix. 354, *partly.* Annual. Stems trailing, slightly hairy. Leaves linear-lanceolate or oblong-lanceolate, 1½–2⅓ in. long, entire, subobtuse, narrowed gradually to the base, sparsely hairy, chiefly on the nerves; petiole up to 6 lin. long. Flowers 1–2 in the axils of the leaves on very short pedicels. Bracts small, linear, tapering, 2 lin. long. Calyx 3 lin. long; sepals lanceolate, glabrous but margin of the outer sepals often ciliate, abruptly acuminate from an ovate base in the fruit. Corolla red, slightly longer than the calyx, up to 4 lin. long. Capsule globose, glabrous 3 lin. in diam. Seeds punctate.—Hallier f. in Engl. Jahrb. xviii. 124.

Nile Land. Kordofan: near Abu-Gerad, *Kotschy*, 17: and without precise locality, *Kotschy*, 45!

Var. *glabra*, Schimper in Herb. Pl. Abyss. 2323.—Stem and leaves nearly or quite glabrous. Leaves linear-oblong, reaching 3½ in. long by 9 lin. broad, but generally narrower. Sepals glabrous or sometimes with bristly ciliate margins.—*I. polygonoides*, Schweinf. Beitr. Fl. Aethiop. 95; Hallier f. in Engl. Jahrb. xviii. 124. *I. coscinosperma*, Hochst. ex Choisy in DC. Prodr. ix. 354 partly. *I. permutata*, Hochst. fide Schweinf. l.c. 96.

Nile Land. Kordofan: at the foot of Arashkol Mountain, *Kotschy*, 376! Abyssinia: near Gageros, 4000 ft., *Schimper*, 2323!

Schweinfurth separates this specifically on account of the ciliated sepals, but this character is a very variable one in this alliance; of the two specimens, otherwise similar, which represent Schimper's collecting, No. 2323 in the British Museum set, one has the sepals quite glabrous, the other strongly ciliate. It was on this collecting that Schweinfurth's species was based. Kotschy's 376 has the sepals quite glabrous, as is also the rest of the plant.

Var. *hirsuta*, Rich. Tent. Fl. Abyss. ii. 66.—Stem and leaves more hairy.

Leaves varying greatly in size, especially in width, from narrowly linear-lanceolate, through linear-oblong to narrowly ovate, from $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, and from $\frac{1}{3}$–$1\frac{1}{4}$ in. broad. Sepals densely hairy on back, ciliate on margin.—Schweinf. Beitr. Fl. Aethiop. 95; Engl. Hochgebirgsfl. Trop. Afr. 346; Hallier f. in Engl. Jahrb. xviii. 124.

Nile Land. Gallabat: near Matamma, *Schweinfurth*, 2145! Kordofan. *Pfund*. Eritrea: Habab, 6000 ft., *Hildebrandt*, 500! Keren, *Steudner*, 963, Abyssinia: near Selassaquilla, towards the River Tacazze, *Schimper*, 1245! near Gageros, 4000 ft., *Schimper*, 164, 2320! Hamedo Plain, 4200 ft., *Schimper*, 851!

8. **I. kotschyana,** *Hochst. ex Choisy in DC. Prodr.* ix. 354. Annual. Stems very slender, trailing, pubescent, 1–2 ft. long. Leaves orbicular, pubescent, 1–2-pinnatifid, 1–$1\frac{1}{2}$ in. in diam.; lobes linear; petiole very short. Flowers solitary, axillary, subsessile. Calyx pubescent, 3 lin. long; sepals ovate, acuminate. Corolla funnel-shaped, half as long again as the calyx. Capsule globose, glabrous, 3 lin. in diam. 3-celled, 6-valved. Seeds small, sparsely pubescent to glabrous, triquetrous. —Hallier f. in Engl. Jahrb. xviii. 125.

Upper Guinea. Senegambia: Dagana, *Perrottet!* and without precise locality, *Heudelot*, 734! *Leprieur.*

Nile Land. Kordofan, *Kotschy*, 13! 51! Darfur: Barkin, *Pfund*, 493! Eritrea: Keren, 4500 ft., *Beccari*, 149!

9. **I. eurysepala,** *Hallier f. in Engl. Jahrb.* xviii. 125. Annual. Erect, dwarf, branched, hairy all over. Habit closely resembling that of *I. coscinosperma*, but the leaves are larger, elongate-ovate, acute, rounded at the base, pale green, the longest nearly 2 in. long, and above 1 in. broad. Sepals larger and much broader than in the species mentioned, broadly ovate with a less deep green point, 5 lin. long and $2\frac{1}{2}$ lin. broad at the flowering time, densely shortly pilose. Corolla scarcely longer than the calyx. Capsule glabrous. Seeds 4, pale yellow, finely punctate.

Nile Land. Kordofan, *Pfund*.

10. **I. commatophylla,** *A. Rich. Tent. Pl. Abyss.* ii. 65. Perennial. Stems tufted, suberect, pubescent, up to $1\frac{1}{2}$ ft. long. Leaves rhomboid, cuneate at the base, 3-lobed, the mid lobe ovate and much exceeding the lateral lobes and irregularly grossly dentate, pubescent, $1\frac{1}{2}$–2 in. long, narrowing to a subacute base; petiole under 1 in. long. Flowers solitary, subsessile in the axils of the leaves. Calyx barely 6 lin. long; sepals abruptly acuminate from a lighter-coloured ovate base. Corolla tubular-campanulate, back hairy, margin densely ciliate, half as long again as the calyx. Capsule globose, glabrous, 3 lin. in diam., 2–4-valved. Seeds small, covered with a short dense brown pubescence. —*Convolvulus commatophyllus*, Steud. in Schimp. Exsic. No. 783.

Nile Land. Abyssinia: Hamedo Plain, 4600 ft., *Schimper*, 172! near Gapdia, *Schimper*, 783! and without precise locality, *Quartin Dillon.*

Var. *angustifolia*, Oliver in Trans. Linn. Soc. xxix. 116. Leaves narrower, with a lanceolate terminal lobe.

Nile Land. Uganda : Unyoro, upon and near surface rocks in the forest, *Speke & Grant !*

This comes very near the Australian *I. heterophylla*, R. Br., with which it is united by Hallier in Engl. Jahrb. xviii. 125. The seeds of the Australian plant are slightly smaller, and have a mottled brown-black pubescence, whereas the seeds in the African specimens bear a shorter uniform brown pubescence.

11. **I. leptocaulos,** *Hallier f. in Engl. Jahrb.* xviii. 126. Perennial. Stems long, slender, climbing, like the whole plant sparsely and minutely puberulous. Leaves long petioled, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad at the base, deeply cordate-sagittate, acute, sometimes glabrous above, pubescent beneath. Peduncle very short, 1–2-flowered; pedicels subclavate, up to 6 lin. long. Sepals linear-lanceolate, equal, pubescent, glaucous green, 3 lin. long. Corolla under 1 in. long, pale red, funnel-shaped. Capsule small, glabrous.

Upper Guinea. Togo : near Bismarckburg, *Büttner*, 365.

12. **I. Morsoni,** *Baker in Kew Bulletin*, 1894, 71. Annual. Stems very slender, twining, subglabrous. Leaves entire, cordate-ovate, acuminate, sparsely hairy on both surfaces, up to $2\frac{1}{2}$ in. long, with a broad rounded open basal sinus; petiole 1–$1\frac{1}{2}$ in. long. Flowers solitary from the axils of the leaves on peduncles 3–4 lin. long. Calyx glabrous, 3 lin. long; sepals ovate, acute to acuminate. Corolla funnel-shaped, whitish, twice as long as the calyx. Fruit and seeds glabrous.

Upper Guinea. Sierra Leone, *Morson !*

13. **I. demissa,** *Hallier f. in Engl. Jahrb.* xviii. 129. Perennial. Stems slender, procumbent or flexuose at the tip, glabrous. Leaves shortly petioled, cordate-ovate, $1\frac{1}{2}$ in. long, glabrous, ciliate; petiole clothed with minute spreading hairs. Peduncle 1–2-flowered, about 1 in. long; pedicels divaricate, subclavate, 6–8 lin. long; bracts minute, subclavate. Sepals linear-lanceolate, acuminate, pubescent, 3 lin. long. Corolla under 1 in. long, chamois yellow, funnel-shaped.—Hallier f. in Engl. Jahrb. xxviii. 38; Dammer in Engl. Pfl. Ost-Afr. C. 331.

Mozamb. Dist. German East Africa : Uniamwezi; Gonda (Igonda), *Böhm.* 38.

Hallier (in Engl. Jahrb. xxviii. 38) places this species between *I. fragilis* and *I. obscura* in the section *Leiocalyx*, but the linear-lanceolate, very acute, shortly cinereo-pilose sepals seem to remove it from this affinity.

14. **I. curtipes,** *Rendle.* Annual. Stems slender, twining, finely pubescent, with a faint reddish tinge. Leaves entire, linear-oblong narrowing to the apex on the upper part of the shoot, becoming cordate-ovate below, apex subacute, mucronulate, basal lobes rather small, rounded, spreading, slightly pubescent on both sides, hairs adpressed, $1\frac{1}{4}$–2 in. long; petioles slender, $\frac{1}{2}$–1 in. long. Flowers solitary in the axils of the leaves; peduncles almost suppressed; bracts small, lanceolate, about 1 lin. long; pedicels 3–4 lin. long. Calyx thinly pubescent; sepals ovate, obtuse, $2\frac{2}{3}$–3 lin. long, the inner slightly narrower with shortly acuminate apex. Corolla funnel-shaped, purplish, very hairy, 6 lin. long. Filaments unequal, $1\frac{2}{3}$–2 lin. long, base slightly dilated and shortly hairy;

anthers cordate, $\frac{1}{2}$ lin. long. Ovary hairy; annular disc conspicuous; style 2 lin. long. Fruit and seeds not seen.—*I. aff. leptocaulos*, Hallier f. in Engl. Jahrb. xviii. 127.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, iii. 3!

15. **I. recta,** *De Wild. Études Fl. Katanga*, 114. Stems erect, unbranched, 8–10 in. long, densely covered with short spreading hairs. Leaves linear-lanceolate with cuneiform base and apex, apiculate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ lin. broad, upper surface thinly hairy, lower surface with a silvery indumentum, margin ciliate; petiole 1 lin. or less long. Flowers axillary, solitary, erect; peduncle hairy, 5 lin. long, bearing above the middle two linear-lanceolate persistent bracteoles, $3\frac{1}{2}$–5 lin. long. Sepals linear, about 2 lin. long and barely 1 lin. broad, hairy on the median nerve. Corolla tubular-funnel-shaped, about $1\frac{1}{4}$ in. long; tube slightly swollen at the middle and 1–$1\frac{1}{2}$ lin. in diam. at the base. Stamens alternately long and short, hairy at the base. Ovary glabrous.

South Central. Congo Free State: Katanga; Lukofu, *Verdick*, 306.

16. **I. mweroensis,** *Baker in Kew Bulletin*, 1895, 291. Stems wide-climbing, slender, purple, clothed with fine spreading hairs. Leaves petioled, cordate-ovate, acute, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, green, and hairy on the main nerve on the upper face, thinly pilose and purple beneath; petiole about 6 lin. long. Cymes laxly few-flowered; peduncle nearly as long as the leaf, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long; pedicels long; bracts lanceolate. Calyx 3 lin. long; sepals narrowly ovate-acuminate, slightly pilose. Corolla white, with 5 pilose bands outside, broadly funnel-shaped, $1\frac{1}{4}$ in. long. Stamens $\frac{1}{3}$ the length of the corolla.

Mozamb. Dist. British Central Africa: Tanganyika-Moero Plateau, *Carson*, 23!

Resembles *I. mombassana*, Vatke, but is distinguished by the shorter sepals without the sagittate base.

17. **I. blepharophylla,** *Hallier f. in Engl. Jahrb.* xviii. 125. Rootstock woody. Stems slender, trailing, densely clothed with short yellowish spreading hairs. Leaves linear to linear-oblong, obtuse, mucronate, rounded at the base, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, to about $\frac{1}{2}$ in. broad, sparsely pilose on both sides, or often only on the nerves of the under face, margin densely ciliolate; petiole very short. Peduncle very short, 1-flowered; bracteoles minute, linear. Calyx shortly hairy and ciliate, 6 lin. long. Sepals, 3 outer lanceolate subobtuse, 2 inner narrower and slightly longer. Corolla reddish, narrowly funnel-shaped, 2 in. long; tube slender, cylindrical in the lower third. Capsule glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 732.

Upper Guinea. Gold Coast: Afrom plains, *Johnson*, 728!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*. 1818!

Lower Guinea. Angola: Ambaca, *Welwitsch*, 6193!

Var. *cordata*, Rendle in Journ. Bot. 1896, 37.—Leaves ovate-oblong, broader than in the type, cordate at the base.

Mozamb. Dist. British East Africa: Kikuyu; Marungu, *Gregory!*

18. **I. Debeerstii,** *De Wild. Études Fl. Katanga,* 114. Stems erect, unbranched, about 8 in. long, densely clothed with long spreading hairs (reaching 1½ in. long). Leaves elliptic-lanceolate, acute or apiculate, with broadly cuneiform or rounded base, ¾–1⅓ in. long, 3½–5 in. broad, rather deep green and bearing long hairs on both surfaces, margin long-ciliate; petiole 1 lin. long. Flowers axillary, solitary, erect; peduncle about 6 lin. long, clothed with long hairs, and bearing above the middle two lanceolate-oblong persistent bracteoles, 6–8 lin. long, often unequal. Sepals linear, hairy, about 4 lin. long, and 1¼ lin. broad. Corolla tubular, funnel-shaped, barely 1½ in. long; tube very slightly swollen in the middle, and 1–1½ lin. in diam. at the base. Stamens alternately long and short, hairy at the base. Ovary glabrous.

South Central. Congo Free State: Katanga; Upper Marungu, *Debeerst,* 95.

19. **I. Paulitschkei,** *Schweinf. & Volk. Liste Pl. Somalis,* 10. A glabrous perennial, with prostrate grooved trigonous stems. Leaves shortly petioled, oval or subobovate, 1 in. long, glabrous on both surfaces, ciliolate on margin, often shallowly 3-lobed. Flowers ternate; peduncle as long as the petiole (about ½ in.); pedicels short; bracteoles minute. Sepals 5 lin. long, lanceolate, unequal, distantly ciliate, clothed at the base outside with white bristly hairs. Corolla 1¼ in. long. shortly funnel-shaped, glabrous, rose-purple; lobes rounded, reaching halfway down. Filaments short, less than 1 lin. long; anthers linear-sagittate, 2 lin. long. Style very short, scarcely ½ lin. Ovary 4-celled; seeds 4, glabrous, smooth.—Ghika, Pays des Somalis, 210.

Nile Land. Somaliland; between the Rivers Jerer and Faf, *Prince Ghika.*

20. **I. porrecta,** *Rendle & Britten in Journ. Bot.* 1894, 172. Perennial. Stems from a nodose woody rootstock 2–5 ft. long, sarmentose, clothed as are the petioles, peduncles, bracts and sepals, with short stiffish yellowish hairs. Leaves shortly petioled, narrowly elliptic or frequently narrowly ovate-triangular with a shortly cordate base, 1½–2 in. long, 6–9 lin. broad, obtuse, with a mucro, subglabrous except on the veins, shortly ciliate on the margin. Cymes dense; peduncles up to 2½ in. long, few-flowered; pedicels very short; bracts lanceolate-subulate, 4–5 lin. long. Sepals 9 lin. long, about equal in length, but the outer broader, ovate, acuminate, and the inner almost subulate. Corolla funnel-shaped, rose-violet, 1¾ in. long, slightly pilose outside.—Hiern in Cat. Afr. Pl. Welw. i. 733.

Lower Guinea. Angola: Ambaca; hilly places near Puri-Cacarambola, *Welwitsch,* 6194! Amboella; Quiriri River, above Sakkemecho, 4000 ft., *Baum,* 820.

Hallier in Baum's Kunene-Sambesi Exped. 346, cites Baum's plant as "*I. blepharophylla,* Hallier f., var. *cordata,* Rendle = *I. porrecta,* Rendle and Britten"; it is therefore doubtful whether the number should be included here or under *I. blepharophylla.* The two species are quite distinct, the several-flowered almost capitate inflorescence at the end of the long peduncle, being characteristic of *I. porrecta.*

21. **I. asperifolia,** *Hallier f. in Engl. Jahrb.* xviii. 128. Stems from a thickened woody rootstock, slender, trailing, densely clothed with short yellowish spreading hairs. Leaves oblong-ovate to triangular-mucronate, base retuse to shallowly cordate, ovate, obtuse, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, clothed in both surfaces with short stiffish yellowish adpressed hairs; petiole very short, generally less than 6 lin. Flowers solitary or geminate in the axils of the leaves; peduncles $\frac{1}{4}$–1 in. long; bracteoles linear, 3 lin. long; pedicels short. Calyx hairy, like the leaves, 6 lin. long; sepals ovate, acute, the two inner lanceolate. Corolla funnel-shaped, purple or rose-colour, twice as long as the calyx. Capsule glabrous, shorter than the calyx.—Hiern in Cat. Afr. Pl. Welw. i. 733.

Lower Guinea. Angola: Huilla, bushy pastures near Lopollo, *Welwitsch,* 6126 !

22. **I. tenuirostris,** *Choisy in DC. Prodr.* ix. 379. Perennial Stem slender, twining, more or less densely clothed with yellowish spreading hairs. Leaves entire, cordate-ovate, acute, mucronate, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, somewhat sparsely clothed on both surfaces with short adpressed hairs; petiole hairy like the stem, 1–2 in. long. Peduncle 1–3 in. long; cymes generally dense, many-flowered, compound; pedicels short; bracts lanceolate, acute, about $1\frac{1}{2}$ lin. long, hairy like the sepals. Calyx densely minutely hirsute on back and margin, hairs yellowish. Sepals 4–5 lin. long, ovate-lanceolate, acute to acuminate, the inner narrowly lanceolate. Corolla funnel-shaped, 1 in. long, midpetaline areas very distinct, minutely hirsute, white with a purple throat. Capsule globose, glabrous, beaked with the indurated persistent style base, 3 lin. in diam. Seeds brown, minutely velvety, bearing long cottony-white hairs on the upper angles.—A. Rich. Tent. Fl .Abyss. ii. 70; Engl. Hochgebirgsfl. Trop. Afr. 346 and in Ann. Bot. Istit. Roma, vii. 229; Hallier f. in Engl. Jahrb. xviii. 128. *I. acuminata,* Baker in Kew Bulletin, 1894, 72 not of Roem. & Schult. *I. halleriana,* Britt. in Journ. Bot. 1894, 170. *I. zambesiaca,* Britt. l.c. 85 not of Baker. *Convolvulus tenuirostris,* Steud. in Schimp. Pl. Abyss. 1064.

Nile Land. Eritrea: various localities, *Schweinfurth & Riva,* 846! 905! 1080! 1146! 1149! *Terracciano & Pappi,* 180, 1052, 1292; *Ragazzi,* 285; Abyssinia, 6500–7500 ft.: Memsach; near Gennia, *Schimper,* 1064! Tigre; Mount Sholoda, *Schimper,* 373! Begemeder; Anadehr, *Schimper,* 601! Amora Gettel, *Schimper,* 1467! Ankober, *Roth,* 420! and without precise locality, *Schimper,* 62! *Plowden! Steudner.* Somaliland: Harar, *Robecchi-Bricchetti,* 34. Uganda: Kavirondo; between Nandi and Kakamagas, 4000–4500 ft, and two days' march from Nandi, *Whyte!* British East Africa: by the River Kiroruma (Kiloluma), *Gregory!*

Mozamb. Dist. British Central Africa: Nyasaland; between Kondowe and Karonga, 2000–6000 ft., *Whyte!* Masuka Plateau, 6500–7000 ft., *Whyte!* Shibisa to Tshinmuza, *Kirk!* Blantyre, *Buchanan,* 107! Mount Chiradzulu, *Whyte!* and without precise locality, *Buchanan,* 394! 560!

23. **I. fulvicaulis,** *Hallier f. in Engl. Jahrb.* xviii. 128. Perennial. Stems from a woody rhizome, slender, twining, densely persistently pubescent, with yellow-brown hairs. Leaves elliptic-ovate, $1\frac{1}{2}$–3 in.

long, $\frac{2}{3}$–$1\frac{3}{4}$ in. broad, entire, obtuse or emarginate, base shallowly cordate to subtruncate, thinly pubescent above, densely pubescent beneath, especially on the nerves; petiole from $\frac{1}{4}$–2 in. long, very pubescent, like the stem and peduncle. Peduncle $\frac{1}{2}$–$1\frac{3}{4}$ in. long; flowers few, capitate; bracts ovate, foliaceous, persistent, covered on the back and margin as are the sepals, with the characteristic yellowish hairs. Calyx $\frac{1}{2}$ in. long; sepals acute, outer ovate, inner narrower. Corolla funnel-shaped, more than 1 in. long, purple, midpetaline areas sparsely pilosulose. Fruit and seeds not seen.—*Aniseia fulvicaulis*, Hochst. in herb. ex A. Rich. Tent. Fl. Abyss. ii. 74; Choisy in DC. Prodr. ix. 431.

Nile Land. Abyssinia: Mount Sholoda, near Adowa, *Schimper*, 270! and without precise locality, *Parkyns!* British East Africa: Gopo Lal Maru, *Gregory!*

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, *Whyte!*

24. **I. hypoxantha,** *Hallier f. in Engl. Jahrb.* xviii. 128. Perennial. Stems from a woody rootstock, climbing, clothed, like the leaves, with short adpressed yellow pubescence. Leaves shortly petioled, cordate-oblong, obtuse or mucronate, nearly $1\frac{1}{2}$ in. long, 1 in. broad, glabrescent above, densely clothed with short yellow hairs beneath. Peduncle 1-flowered, nearly 1 in. long; bracteoles a little below the calyx, small, subulate. Sepals ovate-lanceolate, acute, minutely hoary, puberulous, $\frac{1}{4}$ lin. long; outer rather broader. Corolla above 1 in. long, entire, thinly hairy.—*I. fulvicaulis*, var. *depauperata*, Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 93.

South Central. Congo Free State: Lunda; Mussumba, *Pogge*, 334.

Apparently a distinct species, differing from *I. fulvicaulis* in the solitary flowers, small bracts, and somewhat smaller sepals.

25. **I. hewittioides**, *Hallier f. in Engl. Jahrb.* xviii. 127. Perennial, with a tuberous rootstock. Stems prostrate or wide-climbing, sparsely clothed like the petioles and peduncles with spreading fulvous hairs. Leaves subcordate-ovate, acute, sometimes slightly pandurate, becoming more or less oblong to oval with a short cordate base in the lower part of the shoot, $1\frac{1}{4}$–3 in. long, $\frac{1}{2}$–$2\frac{1}{4}$ broad, deep green and glabrescent above, paler beneath, with prominent sparsely pilose ribs, margins slightly sinuate and ciliate; petioles $1\frac{1}{2}$–$1\frac{3}{4}$ in. long. Peduncles axillary, very short or long (varying in Welwitsch's specimens from $1\frac{1}{3}$–10 in.), bearing several closely crowded flowers; bracts ovate, acute, $\frac{1}{3}$–$\frac{1}{2}$ in. long and about $\frac{1}{3}$ in. broad, fringed with stiffish yellow hairs, resembling and closely applied to the outer sepals. Sepals diminishing in width from the outer to the inner, the two outer ovate, the median lanceolate, the inner linear-subulate. Corolla pale red or purple, with a lighter limb, 2 in. long, funnel-shaped above, tubular below.—Hiern in Cat. Afr. Pl. Welw. i. 733; Rendle in Journ. Bot. 1901, 14. *I. andongensis*, Rendle and Britten in Journ. Bot. 1894, 171. *I. crassipes*, var. *hewittioides*, Hallier f. in Bull. Herb. Boiss. vii. 49.

Lower Guinea. Angola; swamp near Kitamba, *Buchner*, 578; Pungo Andongo; Sansamanda, *Welwitsch*, 6195! Luxillo, *Welwitsch*, 6223!

Hallier has identified the Welwitsch numbers at the British Museum with his *I. hewittioides*, which differs (from the description) in having a very short subterminal peduncle (axillary in the penultimate leaf-axil); in the Welwitsch plants peduncles are present in most of the leaf-axils, and are generally long. We are unable to follow Hallier's more recent placing of the species as a variety of *I. crassipes*, from which it seems very distinct; it is more nearly allied to *I. fulvicaulis* both in leaf-form and in the dense several-flowered inflorescence.

26. **I. Scotelli,** *Rendle in Journ. Bot.* 1901, 18. A low-growing, perennial undershrub; shoots 2–4 in. long, slender, spreading flexuously from a stout woody rootstock, and, like the petioles, densely covered with short stiffish spreading yellow-brown hairs. Leaves truncate-cordate, 1–1½ in. long and generally as broad, apex rounded or sometimes emarginate, densely covered on both surfaces, especially on the veins, with short stiffish adpressed hairs; petioles ½ to barely 1 in. long. Flowers in axillary sessile dichasia, buds bluntly conical; bracteoles narrowly linear-lanceolate, barely 3 lin. long, hairy on the back like the leaves and sepals; pedicels 2 lin. long or shorter. Calyx 5 lin. long; sepals densely minutely hirsute, the outer elliptic-subacute, 2 lin. broad, the inner linear-acute, less than ½ lin. broad. Corolla purple, tubular-infundibuliform, barely 1 in. long; tube barely 1 lin. in diam. above the base; midpetaline areas minutely hirsute, conspicuously trinerved. Fruit not seen.

Mozamb. Dist. German East Africa: Urundi, 4000–5000 ft., *Scott-Elliot*, 8373!

27. **I. Œnotheræ,** *Hallier f. in Engl. Jahrb.* xviii. 125. Annual. Stems many, ascending, pilose, 6–8 in. long. Leaves petioled; basal linear, 2½ in. long, about 3 lin. wide; cauline linear-oblong, 1½ in. long and about 7 lin. wide, all subacute, repand (sometimes with one or two teeth near the base), narrowed to the base. Peduncles 1-flowered, about 1 in. long. Sepals ovate, acuminate, subaristate, under 6 lin. long, outer broader than the inner. Corolla purple, 1 in. long and broad. Capsule glabrous. Seeds with white hairs.—Baker & Wright in Dyer, Fl. Cap. iv. ii. 49. *Convolvulus Œnotheræ*, Vatke in Linnæa, xliii. 520.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt*, 2767.

Also in the Transvaal and Natal.

28. **I. adumbrata,** *Rendle & Britten in Journ. Bot.* 1894, 173. Suffruticose. Stems prostrate, covered with short whitish hairs, as are the petiole and peduncle. Leaves shortly petioled, oblong, 6–9 lin. long, 3–4 lin. broad, obtuse, truncate or slightly hastate at the base, with the veins raised on the under surface and clothed with short white hairs, densely spotted on both surfaces with minute sunken glands, as are the bracteoles and sepals. Peduncles 1–2-flowered, 3 lin. long; bracteoles 2, narrowly linear-lanceolate, ciliate, 3 lin. long. Sepals

ovate, acuminate, pilose, ciliate, 4–6 lin. long, outer much broader, inner very acuminate. Corolla probably rose-red, 1–1¼ in. long, sparsely and shortly pilose.—Rendle in Journ. Bot. 1901, 14. *I. crassipes*, var. *ononoides*, Hallier f. in Bull. Herb. Boiss. vii. 45. *I. crassipes*, Hook., teste Hiern in Cat. Afr. Pl. Welw. i. 732.

Lower Guinea. Angola: Huilla; in exposed bushy ground near Mumpulla, *Welwitsch*, 6128!

29. **I. Randii,** *Rendle in Journ. Bot.* 1901, 18. An undershrub. Stems strong, prostrate, subtriangular, 1½ lin. thick, bearing, like the petioles and pedicels, numerous short stiffish reddish-brown hairs. Leaves ovate, 3 to barely 3½ in. long by about 1¾ in. broad just above the base, apex rounded, base truncate, bearing numerous short adpressed pale brownish or reddish-brown stiffish hairs on each side, and a dense marginal fringe; veins conspicuous beneath; petioles up to 10 lin. long. Flowers solitary in the leaf-axils; peduncles up to 1⅔ in. long; bracteoles beneath the calyx, narrowly linear-lanceolate, about 7 lin. long, and (like the sepals) densely minutely hirsute on the back. Calyx 10 lin. long. Sepals acuminate, diminishing in breadth from the outer, ovate, to the inner, lanceolate. Corolla purple, funnel-shaped, over 2 in. long; midpetaline areas minutely hirsute. Fruit not seen.

Mozamb. Dist. Rhodesia, Buluwayo, *Rand*, 271!

30. **I. hackeliana,** *Hallier f. in Engl. Jahrb.* xviii. 126. Annual. Stems slender, climbing, pilose. Leaves ovate or lanceolate, cordate or subtruncate at the base, pellucidly glandular, sparsely pilose on both surfaces, margins crimped, pilose, up to 1–1¼ in. long and 9 lin. broad; petiole 2–8 lin. long. Peduncle about 6 lin. long; bracts lanceolate from a narrowly cordate base, 1–1½ lin. long, ciliate on midrib and margin. Calyx hairy, about 6 lin. long; sepals very unequal, the two outer ovate from a cordate base, blunt, the two inner lanceolate in the upper part, but narrow and linear below. Corolla funnel-shaped, rose-red, about 8 lin. long; midpetaline areas hairy. Capsule hairy. Filaments unequal, 2–3 lin. long; anthers lanceolate with sagittate base up to 1 lin. long. Seeds 4, blackish, hairy.—*Aniseia hackeliana*, Schinz in Verhandl. Bot. Ver. Brandenb. xxx. 274.

Lower Guinea. German South-west Africa: Amboland, Olukonda, *Schinz*, 749!

31. **I. convolvulifolia,** *Hallier f. in Engl. Jahrb.* xviii. 126. Perennial? Stems long, procumbent with a woody base, clothed with adpressed yellow hairs. Leaves cordate-subsagittate, 1 in. long, 8 lin. broad, apex rounded, often mucronate, with rounded parallel basal lobes, deep green and thinly pubescent above, grey pubescent, with prominent yellowish veins beneath; petiole less than 6 lin. long. Peduncle short, (rarely up to 6 lin. long), 1–2–flowered; pedicels subclavate; bracts minute, linear. Sepals 4 lin. long, adpressed and minutely pubescent; 3 outer broader, ovate-lanceolate, acuminate, broadened at the base, 2 inner linear-lanceolate. Corolla funnel-shaped, rose-red, minutely

puberulous, above 1 in. long. Capsule glabrous.—Durand & Schinz, Études Fl. Congo, 200.

Nile Land. Niam-Niam : Gumango Hill, *Schweinfurth*, 2926.

32. **I. crassipes,** *Hook. in Bot. Mag. t.* 4068, *var.* **shirensis,** *Baker.* Stem slender, wide-trailing, very hairy, hairs fulvous, long, spreading. Leaves ovate, obtuse, 1–1⅔ in. long, with long spreading fulvous hairs on both sides, truncate at the base ; petiole ¼–⅓ in. long, hairy like the stems and peduncles. Flowers solitary, rarely geminate, peduncles erect, shorter than the leaves (barely 1 in. long), with a pair of large persistent ovate foliaceous bracteoles a little below the calyx ; pedicel about 2 lin. long. Calyx like the leaves hairy, 7–8 lin. long; sepals unequal, the outer ovate, subacuminate, the inner narrower. Corolla funnel-shaped, bright red, 1⅓–2 lin. long. Capsule globose, 4 lin. in diam., glabrous. Seeds glabrous.

Mozamb. Dist. British Central Africa: Nyasaland ; Shire Highlands *Buchanan*, 89 ! Matope to Mandala, *Scott-Elliot*, 8443 !

Characterised by its long tawny hairs on stem and leaves, and the blunt leaves.

Var. *hirta*, Hallier f. in Baum, Kunene-Sambesi Exped. 346. Shoots including peduncles, bracts and sepals densely covered with short fulvous to pale ferruginous subadpressed hairs. Leaves short-stalked, narrowly oblong-lanceolate to ovate, with a shallowly cordate base, 1¼–3 in. long, ¼–1½ in. broad, subobtuse ; petioles 1–7 lin. long. Peduncles short, scarcely exceeding the petioles, or longer, ¼–1¾ in. long ; bracteoles linear-subulate, barely 1–5 lin. long ; pedicel equal to the peduncle or shorter, 1–6 lin. long, Outer sepals ovate with scarcely cordate base, 6–9 lin. long, the narrow inner sepals slightly longer. Corolla 1½ in. long, limb pale rose-colour, throat deeper.

Lower Guinea. Southern Angola : Chitanda River, below Goudkopje, 3800 ft., *Baum*, 151 ! Kubango River, above Kuimarva, 3300 ft., *Baum*, 454

Var. *ukambensis*, Hallier f. in Bull. Herb. Boiss. vii. 46. An undershrub ; branches prostrate, flexuose, clothed, but not densely, with short whitish spreading hairs. Leaves oval or ovate-oblong, apex obtuse, base rounded, up to 1½ in. long and 6 lin. broad, sparsely hairy, like the stem, on both surfaces. Peduncles shorter than the leaves, about 1 lin. long ; bracteoles linear to narrowly elliptic, ⅓ in. long, pedicel about equal to the peduncle. Calyx 6 lin. long, hairy like the leaves, outer sepals ovate, base scarcely cordate. Corolla 1½ in. long ; limb lighter coloured than the throat.—*I. ukambensis*, Vatke in Linnæa, xliii. 510. *I. oblongata*, Dammer in Engl. Pfl. Ost-Afr. C. 331, not of E. Meyer.

Nile Land. British East Africa : Ukamba ; Kitui, *Hildebrandt*, 2762 !

Mozamb. Dist. German East Africa : Kilimanjaro, below Marangu, 3700–4000 ft., *Volkens*, 2139.

33. **I. cardiosepala,** *Hochst. ex Choisy in DC. Prodr.* ix. 429, *not of Meissn.* Annual. Stems very slender, trailing or twining, often branching, pilose, sometimes glabrescent. Leaves cordate-ovate, membranous, thinly hairy, entire, 1–2 in. long, acute or obtuse ; petiole about as long as the blade. Peduncles often short, but varying from ⅓–2 in. long, 1–3-flowered ; pedicels short, deflexed in the fruiting stage ; bracteoles minute, lanceolate. Sepals 3–4 lin. long, the three outer ovate

from a broad cordate base, the two inner narrow, oblong-lanceolate to lanceolate; back minutely pilose, margin conspicuously ciliate. Corolla purplish, funnel-shaped, twice as long as the calyx. Capsule globose, glabrous, about 3 lin. in diam., 2-celled; seeds densely tomentose.—Vatke in Linnæa, xliii. 508; Hiern in Cat. Afr. Pl. Welw. i. 733; Baker & Wright in Dyer, Fl. Cap. iv. ii. 61. *I. blepharosepala*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 72; Schweinf. Beitr. Fl. Æthiop. 95. *I. calycina*, Benth. ex C. B. Clarke in Hook. fil. Fl. Brit. Ind. iv. 201, not Meissn.; Hallier f. in Engl. Jahrb. xviii. 129, and in Jahrb. Hamb. Wiss. Anstalt. xv. 41. *Aniseia calycina*, Choisy in DC. Prodr. ix. 429.

Dr. Capua (in Ann. Istit. Bot. Roma, viii. 227) proposes three varieties under *I. calycina* (*cardiosepala*, *blepharosepala*, and *neglecta*) based on the relative length of peduncle and petiole, and petiole and lamina, and on the form of the basal lobes of the outer sepals, whether cordate or cordate-sagittate. These varieties are founded on specimens from Eritrea, and it does not seem possible to extend them to a series embracing the whole of Tropical Africa. A larger suite of specimens includes numerous intermediate additional forms, and it seems better to consider them all as mere forms of a somewhat variable species.

Nile Land. Nubia: Suakim, *Lord!* Soturba Mountains, *Schweinfurth*, 2178! Kordofan, *Pfund*, 113! 422! 433! 525! *Kotschy*, 207! 384; Eritrea: Dahlak Archipelago, *Steudner*, 949. *Terracciano*, 17, 348, 450, 679, 948; *Pappi*, 4503; and various localities, *Ragazzi & Pappi*, 1238; *Terracciano*, 29, 39; *Terracciano & Pappi*, 7, 31, 45, 2520; *Pappi*, 31, 2956, 3361, 3420, 4034; *Ragazzi*, 135; *Hildebrandt*, 501! *Schweinfurth & Riva*, 102! *Steudner*, 949! 951. *Ehrenberg*. Abyssinia: Modat, *Schimper*, 1780! Schahagenne, *Schimper*, 358! and without precise locality, *Schimper*, 319! *Roth*, 423! Somaliland: near the River Web Ruspoli, *Riva*, 871; Milmil, *Riva*, 284; Nabr Aual, *Robecchi-Bricchetti*, 341; Goetten, *Miss E. Cole!* and without precise locality, *Mrs. Lort Phillips!* British East Africa: Njemps, *Gregory!* between Kikuyu and Eldama Ravine, *Whyte!* Makindu River, *Kässner*, 568!

Lower Guinea. Angola: Provinces of Barra do Dande and Loanda, *Welwitsch*, 6237! Forte de Conceicao, and between Camama and Calumba, *Welwitsch*, 6238! Barra do Bengo; between Quicuxe and Cacuaco, *Welwitsch*, 6236! Mossamedes; River Bero, *Welwitsch*, 6133! Loanda, *Gossweiler*, 151! 271! 323! Penedo, *Gossweiler*, 1512! between Edira and Humbe, 4000 ft., *Baum*, 80! German South-west Africa: Otyimbingue, *Fischer*, 107, 108; Olukonda, *Schinz*, 747.

Mozamb. Dist. British Central Africa: Rhodesia; Buluwayo, *Rand*, 366! Ngamiland; Kwebe, *Lugard*, 125! *Mrs. Lugard*, 159! Kobis to Shaw Valley, *Baines!* Bechuanaland; eastern Bamanguato Territory, *Holub!*

Also in South Africa, Socotra, and India.

34. **I. mombassana,** *Vatke in Linnæa*, xliii. 515. Annual. Stem slender, twining, somewhat laxly pilose, hairs spreading. Leaves entire, ovate from a cordate-sagittate base, acute to subacute, membranous, 1–3 in. long, green and slightly hairy on both surfaces; petiole nearly or quite as long as the blade, or sometimes longer. Flowers solitary on long axillary peduncles exceeding the leaves ($\frac{1}{4}$–$1\frac{3}{4}$ in. long) and bearing above the middle a pair of minute lanceolate acuminate bracteoles, or forming a lax few-flowered monochasial cyme ($2\frac{1}{2}$–3 in. long), bearing narrowly lanceolate long acuminate bracts, 2–3 lin. long; peduncles and pedicels minutely pilose or puberulous. Calyx 4–6 lin.

long; sepals linear-acute from a hastate base, (base of two inner sepals less dilated and elliptic), margin long-ciliate, back sparsely puberulous. Corolla funnel-shaped, whitish with a purple throat, glabrous, $1\frac{1}{3}$–$1\frac{2}{3}$ in. long; midpetaline areas very distinctly limited. Fruit unripe, glabrous, beaked with persistent style-base; seeds not seen—Hallier f. in Engl. Jahrb. xviii. 130; Dammer in Engl. Pfl. Ost-Afr. C. 331.

Nile Land. British East Africa: Lower Tana Valley, Lake Dumi, *Gregory!* Mombasa, *Hildebrandt*, 2048!

Mozamb. Dist. German East Africa, *Hannington!*

35. **I. cordofana,** *Choisy in DC. Prodr.* ix. 350. Perennial. Stems slender, trailing, laxly pilose, hairs long, spreading. Leaves entire, cordate-ovate-orbicular with a broad open sinus, obtuse or subacute, 1–3 in. long and broad, glabrous above, green and thinly hairy, chiefly on the veins on the lower face; petiole hairy like the stem, 1–2 in. long. Peduncles usually shorter than the leaves, 1–3-flowered, hairy like the petioles; pedicels stouter and shorter than the peduncles; bracts ovate, acute, foliaceous, persistent. Calyx hairy, 8 lin. long; sepals linear tapering from an ovate-cordate lower portion (the two inner much narrower, not cordate). Corolla funnel-shaped, white, $1\frac{1}{2}$ in. long, glabrous; midpetaline areas well defined. Capsule globose, 4 lin. in diam. Seeds glabrous.—*Ipomœa auriculata*, Hallier f. in Engl. Jahrb. xviii. 130. *Batatas auriculata*, Hochst. ex Choisy, l.c.

Nile Land. Kordofan: Arashkol Mountain, *Kotschy*, 195! Katul Gambara, *Pfund*, 211! and without precise locality, *Kotschy*, 409!

36. **I. hindeana,** *Rendle in Journ. Bot.* 1901, 13. A low undershrub, with thinly hairy branchlets. Leaves oblong-hastate, about 1 in. by barely half as broad, obtuse, subcordate at the base, dark green and glabrous on the upper surface, minutely hirsute on the veins beneath and on the margin. Flowers in lax 2-flowered axillary cymes; peduncle about 1 in. long; pedicels as long as the peduncle; bract lanceolate, $2\frac{1}{2}$ lin. long. Sepals lanceolate, acute, barely 6 lin. long, sparsely hairy. Corolla funnel-shaped, 1 in. long, probably white; midpetaline areas well-defined, sparsely pilose.

Nile Land. British East Africa: Ukamba; Machakos, *Hinde!*

The foliage, inflorescence, and flower suggest *I. mombassana*, but the sepals show no trace of the basal auricles which characterise that species.

37. **I. heterosepala,** *Baker in Kew Bulletin*, 1895, 222. Stem slender, wide-climbing, pubescent when young; second year stems with a thin wrinkled easily separable cork layer, bearing conspicuous lenticels. Leaves long-petioled, cordate-ovate, 3–4 in. long, $2\frac{1}{2}$–3 in. broad, acuminate, blunt and mucronate at the apex, entire, membranous, green and thinly pubescent on both surfaces, chiefly on the veins. Cymes laxly few-flowered; peduncle 6–8 lin. long. Bracts small, lanceolate from an ovate-cordate base, 3 lin. long. Sepals unequal, membranous, acute, sparsely pubescent to glabrescent, the outer

large, cordate-ovate, 10 lin. long. Corolla broadly funnel-shaped, white, midpetaline areas dark, puberulous, a little over 2 in. long and as broad; limb hardly at all lobed. Style half as long as the corolla.—Hallier f. in Ann. Istit. Bot. Roma, vii. 233.

Nile Land. Somaliland: Golis Range at Darra-as, *Miss Edith Cole! Mrs. Lort-Phillips!* Sheik Pass, *Mrs. Lort-Phillips!*

38. **I. linosepala,** *Hallier f. in Engl. Jahrb.* xviii. 130. An erect much-branched perennial, with a thick fusiform woody root. Stem branched from the base; branches (4–6 in. long) and branchlets subspreading, generally thin, densely leaved and clothed like the leaves with dense long spreading yellowish hairs. Leaves nearly sessile, oval, becoming more or less oblanceolate to obovate, shortly acute to obtuse, base obtuse to subacute; blade rarely exceeding 1 in. in length often less. Flowers solitary on short pedicels (4 lin. long or less) from the axils of the upper leaves with a pair of long linear-subulate bracteoles, above 6 lin. long, below the flower. Sepals linear-lanceolate below with a long linear-subulate upper portion, nearly 8 lin. long, densely ciliate like the young shoots. Corolla probably 1 in. long when spread, infundibuliform-campanulate, pale rose outside, intensely blood-red inside (*Welwitsch*); midpetaline areas trinerved and bearing in the upper portion a few of the characteristic hairs. Capsule dehisced, apparently subspherical, about 3 lin. in diam., valves rather thin, 2-celled, 2-seeded. Seeds blackish, minutely pubescent.—Hiern in Cat. Afr. Pl. Welw. i. 734. *I. xiphosepala*, Baker in Kew Bulletin, 1894, 69.

Lower Guinea. Angola: Pungo Andongo; rocks near Catete, *Welwitsch*, 6191!

39. **I. involucrata,** *Beauv. Fl. Owar.* ii. 52, *t.* 89. Annual. Stems slender, twining, finely hairy to glabrescent. Leaves cordate-ovate, acute, entire, membranous, more or less adpressed, hairy on both faces, $1\frac{1}{2}$–3 in. long, 1–$2\frac{1}{2}$ in. broad; petiole as long as the blade. Peduncle slender, 1–3 in. long; flowers several to many in a head, enclosed in a large hairy foliaceous boat-shaped bract, $1\frac{1}{2}$–2 in. in diam., with two cusps; inner bracts smaller, bluntly-obovate or oblanceolate to linear-oblong. Sepals glabrescent or sparsely hairy on the back, margin strongly setose, especially above the middle, lanceolate, acuminate, about 6 lin. long, the inner shorter and ovate. Corolla funnel-shaped, bright rose-red, $1\frac{1}{4}$–2 in. long; limb $1\frac{1}{2}$–2 in. in diam.; midpetaline areas conspicuous, minutely pilose. Capsule small, globose, glabrous. Seeds shortly pubescent or glabrous.—Choisy in DC. Prodr. ix. 365; Oliv. in Trans. Linn. Soc. xxix. 116; Engl. Hochgebirgsfl. Trop. Afr. 346; Hallier f. in Engl. Jahrb. xviii. 135, and in Bull. Herb. Boiss. v. 375; Hiern in Cat. Afr. Pl. Welw. i. 735; De Wild. & Durand in Bull. Herb. Boiss. ser. 2, i. 36, Contrib. Fl. Congo, i. fasc. 2, 43, and Reliq. Dewevr. 165; Durand & Schinz, Etudes Fl. Congo, 200; var. *hirsutior*, Benth. in Hook. Niger Fl. 466. *Convolvulus perfoliatus*, Schumach. & Thonn. Beskr. Guin. Pl. 89.

Upper Guinea. Senegambia: *Perrottet*, 508! *Heudelot*, 751. Gambia, *Ingram! Brown-Lester*, 24! Sierra Leone, *Barter*, 1748! *Don! Scott-Elliot*, 3845! *Reade! Turner! Smeathman!* Liberia: near Monrovia, *Whyte!* Cape Palmas, *Vogel*, 43! Gold Coast: Aburi, *Johnson*, 239! Ashanti, *Cummins!* Dahomey, *Burton!* Togo: Bismarckburg, *Kling*, 175; *Büttner*, 119, 221. Lagos, *Barter*, 20185! *Dawodu*, 18! *Irving!* Southern Nigeria: Onitsa, *Barter*, 1748! Cameroons, *Bates*, 44! *Dinklage*, 218, 1148, *Braun*. Fernando Po, *Vogel*, 234!

Nile Land. Uganda: Unyoro forest, *Grant!* Ruchigga, 7000 ft., *Bagshawe*, 527! Musozi, *Bagshawe*, 9! Kavirondo, *Whyte! Scott-Elliot*, 7103! 7406! Ruwenzori, *Scott-Elliot*, 7981!

Lower Guinea. Gaboon; Sibange, *Soyaux*, 385! 398! *Büttner*, 378. Lower Congo: Msuata, *Büttner*, 379; Kisantu, *Gillet*, 449*b*, 760; Bingila, *Dupuis;* Zobe, *Dewèvre*, 246; Leopoldville, *Luja!* and without precise locality, *Laurent, Cabra, Descamps; Smith*, 63! Angola: Golungo Alto, *Welwitsch*, 6188! Huilla, *Welwitsch*, 6123! and without precise locality, *Curror! Monteiro!*

South Central. Congo Free State: various localities, *Hens*, 107! *Büttner*, 380; *Pogge*, 972, 1188, 1198, 2027.

Mozamb. Dist. German East Africa: Zanguebar, *Kirk*, 77! Kilimanjaro to 8400 ft., *Meyer*, 104, 303; Gonda (Igonda), *Böhm*, 273; Ukira, *Fischer*, 414; Rungwe Stock, 5500 ft., *Goetze*, 1139; Kinga Mountains, *Goetze*, 1202. North of Lake Nyasa, *Thomson!* British Central Africa: Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt!* Urungu; Fwambo, *Nutt!* Rhodesia, Salisbury, *Rand*, 561!

Var. *albiflora*, Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 735.—Corolla, according to Welwitsch, smaller than in the type, campanulate and white. No flower is present in the specimens, but an unexpanded corolla measures nearly 1 in. long.

Lower Guinea. Angola: Golungo Alto; thickets between Bengo and Sange, near Canaulo and Camilungo, *Welwitsch*, 6189!

40. **I. operosa,** *C. H. Wright in Kew Bulletin*, 1897, 275. Stems climbing, densely pubescent. Leaves distinctly petioled, cordate-ovate, 4–5 in. long, acute, upper face covered with short adpressed whitish-yellow hairs, lower face shortly tomentose. Flowers many in a dense head; bract large, cymbiform, acute, clothed with long hairs, especially at the base. Sepals unequal, narrowly linear-lanceolate, acute, densely pilose, about 6 lin. long, the outermost 7 lin. Corolla bright red, glabrous, not lobed, $1\frac{1}{2}$ in. long. Stamens half as long as the corolla.—*I. involucrata*, var. *operosa*, Hallier f. in Engl. Jahrb. xxx. 387.

Mozamb. Dist. British Central Africa: Nyasaland; Zomba, *Kirk! Whyte!* and without precise locality, *Buchanan*, 370!

A troublesome weed with a long spongy tap-root.

41. **I. pileata,** *Roxb. Fl. Ind. ed. Carey*, ii. 94. Annual. Stems very slender, twining, shortly pilose. Leaves cordate-ovate, acute, entire, membranous, $1\frac{1}{2}$–2 in. long and broad, green and thinly hairy above, paler and thinly hairy beneath; petiole slender, as long as the blade or shorter, pubescent. Peduncle $\frac{1}{2}$–2 in. long. Flowers few or many in a dense head enclosed in a large foliaceous boat-shaped bract, $1\frac{1}{2}$ in. or less in diam., with two cusps; inner bracts narrowly elliptic to

subspathulate, obtuse. Calyx barely 6 lin. long; outer sepals spathulate-oblong, the inner lanceolate. Corolla-tube slender, cylindrical, 1 in. long; limb spreading, about 1 in. in diam. Capsule small, globose, fragile, glabrous. Seeds glabrous or thinly pubescent.—Wight, Ic. t. 1363; Choisy in DC. Prodr. ix. 365.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, ser. iii. 1!

Mozamb. Dist. British Central Africa: Urungu; Fwambo, *Carson!* Nyasaland: Lake Nyasa, *Simons!* and without precise locality, *Cameron*, 7!

Also Tropical Asia and the Mascarene Islands. The corolla-tube is much narrower than in *I. involucrata*, with which it is united by Hallier, and the sepals also differ in shape.

42. **I. crepidiformis,** *Hallier f. in Engl. Jahrb.* xviii. 131. Annual, erect, branched, almost with the habit of *Crepis*; stem 2 ft. long, with laxly leafy branches, clothed with adpressed hairs, somewhat silkily strigose at the apex. Leaves shortly petioled, linear-lanceolate to oblong, acute or obtuse, entire, 2–2½ in. long, 3–9 lin. broad, sparsely pilose above at first white-silky beneath, sparsely pilose when mature. Flowers congested in small dense heads, with rigidly erect, rather slender, suberect or ascending peduncles, about 3 in. long; bracts small, setaceous, long ciliate. Sepals lanceolate, broader and rather longer than the bracts, tapering at the apex, 3 lin. long, white-silky with a conspicuous green lip. Corolla rose-red, above 1 in. long; midpetaline areas minutely silky outside, and limited by a more deeply coloured nerve.—Hallier f. in Engl. Jahrb. xxviii. 31. *I. tanganyikensis*, Baker in Kew Bulletin, 1895, 70.

Mozamb. Dist. German East Africa: Uniamwezi; Gonda (Igonda), *Böhm*, 265; Masai Steppes, *Stuhlmann*, 93; Ugogo, *Stuhlmann*, 344. Lake Tanganyika, *Cameron!* British Central Africa: Urungu; Fwambo, *Carson*, 73!

Var. *minor*, Rendle in Journ. Bot. 1901, 20.—Shoots reddish, up to 9 in. long and 1 lin. thick; upper leaves reaching 1½ in. long by ¼ in. broad.—*I. taborana*, Dammer in Engl. Pfl. Ost-Afr. C. 333 (plant not seen).

Nile Land. British East Africa: Machakos, 5000–6000 ft., *Scott-Elliot*, 6391!

Mozamb. Dist. German East Africa: Uniamwezi; Tabora, *Stuhlmann*, 595.

43. **I. microcephala,** *Hallier f. in Engl. Jahrb.* xviii. 131. Annual. Stems erect, simple, densely leafy, ½–1 ft. long. Leaves subsessile, elliptic-lanceolate, acute, ¾–1¼ in. long, 6 lin. broad, minutely hairy above, shining white-silky beneath. Flowers in dense globose heads on long peduncles. Sepals narrow and ciliate, just like the bracts. Corolla under 1 in. long, 5 lin. in diam.—Hallier f. in Engl. Jahrb. xxviii. 31.

Nile Land. Somaliland: Alghe, *Riva*, 1319.

Mozamb. Dist. German East Africa: Kagehi, *Fischer*, 413.

Very near *I. crepidiformis*, Hallier f., but, according to the author, easily distinguished by its lower dense growth, elliptic leaves with their silvery undersurface and small flowers. It it evidently very near to the var. *minor*, but differs in its much broader leaves.

44. **I. chloroneura,** *Hallier f. in Engl. Jahrb.* xviii. 132. Annual. Main stem erect, a few inches high, branched from the base; branches widely spreading, prostrate or ascending, and again branched; branches and branchlets especially when young bearing, like the petioles and peduncles, dense adpressed short white hairs and longer spreading golden-yellow hairs. Leaves entire, oval, obtuse, 1–2¼ in. long, up to 13 lin. broad, generally narrower, when young bearing dense adpressed white hairs above, similarly but still more densely hairy beneath, with a line of golden hairs on the veins and margin; older leaves less densely and conspicuously hairy; petiole 3–6 lin. long. Peduncles 1–1⅓ in. long, increasing to 2½ in. or more in fruit. Flowers few in a small dense head; outer bracts foliaceous resembling the young leaves in form and covering, but smaller, about 6 lin. long (including the stalk), persisting and enlarging in fruit (to 1 in.). Sepals subequal, elliptic-lanceolate, 3 lin. long, lower half with thinner glabrous edges, thicker median portion prolonged above into an almost filiform densely hairy tail. Corolla funnel-shaped, "whitish or very pale yellow" (*Welwitsch*), a little longer than the calyx; midpetaline areas well-defined, bearing short white hairs, which also project from the tip of the blunt corolla-lobe. Capsule globose, glabrous, 3 lin. in diam. Seeds with a pale fawn-coloured silky pubescence.—Hiern in Cat. Afr. Pl. Welw. i. 734.

Lower Guinea. Angola: Pungo Andongo; by the river Cuanza, near Lombe, *Welwitsch*, 6181! Huilla; about Lopollo, *Welwitsch*, 6132! by the Kuito River, between Kutue and Sobi, *Baum*, 755!

Mozamb. Dist. British Central Africa: Ngamiland; Botletle Valley, *Lugard*, 190!

45. **I. argentaurata,** *Hallier f. in Engl. Jahrb.* xviii. 132. In habit and indumentum closely resembling *I. chloroneura*, but much larger. Leaves shortly petioled, oblong with a subcordate base and rounded mucronate apex, up to 2½ in. long by ¾–1¼ in. broad, densely strigose on the upper surface and deep green, silvery-silky below, veins contrasting less with the intervening leaf-space, than in *I. chloroneura*. Heads of flowers much larger than in *I. chloroneura*, densely strigose, as is sometimes also the stem, with long golden-yellow hairs. Bracts about 1 in. long, hairy like the calyx. Sepals linear-lanceolate or almost linear, acuminate, about 6 lin. long, silky white on back with yellow strigose margin. Corolla large, funnel-shaped, entire, whitish, 2 in. long, nearly 1¾ in. wide; midpetaline areas adpressed, hirsute. Capsule glabrous; seeds covered with a dense dark brown pubescence.—*I. amœna*, Benth. in Hook. Niger Fl. 466, not of Choisy.

Upper Guinea. Togo: between Misahöhe and Bismarckburg, *Büttner*, 746. Lagos: Ado, *Rowland!* Northern Nigeria: Zungeru, *Elliott*, 16! Nupe, *Barter*, 1031! Quorra, *Vogel*, 123!

Closely allied to *I. chloroneura*, but differing in its much larger flowers and flower-heads, leaves with subcordate base, &c.

46. **I. abyssinica,** *Schweinf. Beitr. Fl. Aethiop.* 94. Stems stout, woody, hollow, erect, nearly 2 ft. long and 2 lin. thick at the base, densely hairy. Leaves ovate or the lower smaller ones more or less oblong, ascending, entire, acute or the lower obtuse, $1\frac{1}{4}$–3 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad, greenish and hairy above, whitish and more densely hairy beneath; petiole very short. Flowers in dense heads from the axils of the upper leaves on ascending peduncles, 1–2 in. long, mixed with persistent lanceolate very hairy foliaceous bracts, reaching $1\frac{1}{4}$ in. long. Sepals ovate-lanceolate to lanceolate, apex acuminate, the outermost nearly 8 lin. long by $2\frac{1}{2}$ lin. broad, the innermost 6 lin. long by $1\frac{1}{2}$ lin. broad, densely covered on the back with long yellowish hairs. Corolla campanulate-funnel-shaped, 1–$1\frac{1}{3}$ in. long, and about as broad, tube and throat deep red-purple, limb yellow, silky outside. Fruit and seeds not seen.—Hallier f. in Engl. Jahrb. xviii. 132; Engl. Hochgebirgsfl. Trop. Afr. 346. *Convolvulus echioides*, Hochst. in Schimp. Pl. Abyss. Ser. i. No. 351. *Argyreia ? abyssinica*, Choisy in DC. Prodr. ix. 332; A. Rich. Tent. Fl. Abyss. ii. 63.

Nile Land. Abyssinia: Mount Scholoda, *Schimper*, 351! Amogai, 6800 ft., *Schimper*, 371! near Tchelatchekenneh, on the River Tacazze, *Quartin-Dillon*. Shireh, *Quartin-Dillen*, 64!

47. **I. Atherstonei,** *Baker in Dyer, Fl. Cap.* iv. ii. 53. A shrubby perennial. Stem trailing, angular, densely covered with short stiffish tawny spreading hairs. Leaves ovate, entire, $1\frac{3}{4}$–2 in. long by about $1\frac{1}{4}$ in. broad, apex emarginate, base truncate or shallowly retuse; surfaces and margins bearing a dense tawny tomentum; veins conspicuous on the lower face; petiole barely 6 lin. long. Peduncles hairy like the stem and petiole, $1\frac{1}{4}$ in. long, bearing a dense few-flowered cyme, which may be reduced to a solitary flower. Bracts lanceolate, subacute, about 6 lin. long, tomentose like the leaves and sepals. Calyx 9–10 lin. long, outer sepals ovate, acute, inner narrower. Corolla purplish $2\frac{1}{4}$ in. long; midpetaline areas pilose. Fruit and seed unknown.

Lower Guinea. German South-west Africa, lat. 23°, *Chapman & Baines!* Also in Bechuanaland and the Transvaal.

48. **I. amœna,** *Choisy in DC. Prodr.* ix. 365. Annual. Stems twining, densely clothed with fine soft spreading golden-yellow hairs, associated in the younger parts as also in the petiole and peduncle with short adpressed white hairs. Leaves entire, shallowly cordate, ovate, acute, $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, $\frac{2}{3}$–2 in. broad, green and slightly hairy above, densely clothed with long adpressed whitish silky hairs beneath, and on the veins and margin with longer yellow hairs; petiole $\frac{1}{2}$–3 in. long, densely hairy like the young shoot and peduncles. Peduncles exceeding the petiole of the subtending leaf, but generally shorter than the leaf. Flowers in a densely hairy cymose head; bracts persistent, foliaceous, the outer bluntly linear-lanceolate to lanceolate, 6–8 lin. long, sometimes nearly $1\frac{1}{2}$ in. in the fruiting stage, clothed with adpressed white

silky hairs beneath like the leaves, and in the lower part and on the margin with the characteristic yellowish hairs; the inner similar but smaller. Sepals subequal, shorter than the bracts, linear-lanceolate, acute, 3 lin. long, densely clothed, especially in the upper part, with long stiffish yellowish hairs which project beyond the tip. Corolla funnel-shaped, purple-violet or milky with a purple-crimson throat, twice as long as the calyx (barely 2 lin. long); midpetaline areas bearing long stiffish hairs on the upper part of the limb which project in a tuft at the top of the lobes. Capsule small, glabrous, 2-celled. Seeds 4, with a short brown pubescence.—Hallier f. in Engl. Jahrb. xviii. 133, xxviii. 31; Hiern in Cat. Afr. Pl. Welw. i. 734; Durand & Schinz, Études Fl. Congo, 199.

Nile Land. Nubia, Kordofan, Sennaar, *Husson* (teste Hallier f.).

Upper Guinea. Senegambia: *Heudelot*, 146! Gambia: *Ingram! Park!* Gold Coast: Krepe Plains, *Johnson*, 544! Cape Coast Castle, *Brass!* Lagos, *Rowland!* Northern Nigeria: confluence of the Niger and Benue (Chadda) Rivers, *Barter!*

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 66. Boma, *Dupuis*; and without precise locality, *Smith! Cabra!* Angola: Ambriz, at Quizembo, *Welwitsch*, 6197! Cazengo; River Luinha, on the way up to Mount Muxaulo, *Welwitsch*, 6198! Golungo Alto; Bango and Canaulo, *Welwitsch*, 6199! Pungo Andongo, *Welwitsch*, 6200!

South Central. Congo Free State: Mtowa, *Descamps*. Central Congo: Ukoti, *Wilwerth*. Manganga, *Demeuse*; between Nyangwe and Kimbundo, *Pogge*, 989; Bolama, *Pogge*, 1186.

49. **I. velutipes,** *Welw. ex Rendle in Journ. Bot.* 1894, 175. Perennial. Stems climbing, the barren shoots covered with a thick pale straw-coloured tomentum, the flowering almost glabrous. Leaves long-petioled, cordate-ovate, acuminate, entire, 4–6 in. long and nearly as broad, rather smaller on the flowering branches, those of the barren shoots more or less thickly tomentose on both sides, those of the flowering shoots only slightly hairy on the veins. Peduncles robust, longer than the leaves; flowers subcapitate; bracts lanceolate-acuminate, the outer largest, $\frac{2}{3}$–1 in. long, thinly shortly hairy on the back, margin glandular and shortly ciliate. Sepals similar in shape to the bracts, rather more pilose, 5 lin. long. Corolla infundibuliform-campanulate, fugacious, $1\frac{1}{2}$ in. long, rose-red on the outside, inside (especially in the lower half) a deep shining blood-purple. Capsule globose, thin-walled, hairy, about 3 lin. in diam., 4-valved. Seeds shortly hispid, hairs brown.—Hiern in Cat. Afr. Pl. Welw. i. 735. *I. Verdickii*, De Wild. Etudes Fl. Katanga, 113, t. 3, figs. 9–16.

Lower Guinea. Angola: Golungo Alto; Zengas do Queta and Queta Mountains, *Welwitsch*, 6142! 6226! 6227! 6228!

50. **I. chætocaulos,** *Hallier f. in Engl. Jahrb.* xviii. 133. Stems long, climbing, clothed with spreading golden-yellow bristly hairs. Leaves suborbicular, long-petioled, cordate, acuminate, angled, $3\frac{1}{2}$ in. long and about 3 in. broad, densely strigose and yellowish-green above, pallid and less hairy beneath; petiole up to 4 in. long. Flowers in

dense heads on stiffly spreading peduncles, as long as the petioles; bracts large, broadly ovate, acute, with stiff spreading hairs, the outer 9 lin. long, nearly 8 lin. broad. Calyx and corolla known in bud only.

Nile Land. Jur: Jur Ghattas; *Schweinfurth*, 2607.

51. **I. chrysochætia,** *Hallier f. in Engl. Jahrb.* xviii. 133. Stems slender, wide-climbing, thinly clothed with spreading rather bristly hairs. Leaves exactly cordate, acuminate, over 3 in. long, by barely 2½ in. broad, adpressed strigose on both sides, rough and dark green above, a little paler with dark reticulated veins beneath; petiole 1–2 in. long, clothed, as are also the neighbouring parts of the stem, with long spreading yellow hairs. Flowers in dense dark heads on stiff distant peduncles 1–2½ in. long, grey-hirsute, especially at the apex; bracts small. Sepals scarcely larger than and similar to the bracts, lanceolate, acute, hairy, 5 lin. long, 1–1⅓ lin. broad. Corolla funnel-shaped, glabrous, 1½ in. long, 1¼ in. wide, probably rose-red. Fruit and seeds not seen. —Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 93. *I. polytricha*, Baker in Kew Bulletin, 1894, 71.

Lower Guinea. Loango: near Chinchocho, *Soyaux*, 83! Lower Congo: woods at Bingila, *Dupuis*; Kisantu, *Gillet*, 1125.

52. **I. lasiophylla,** *Hallier f. in Bull. Soc. Bot. Bely.* xxxvii. 94, *and in Engl. Jahrb.* xxviii. 32. A climbing pubescent herb; branches terete, woody, which like the petioles and peduncles are hoary- or yellowish-puberulous. Leaves subcordate, acuminate, 2 in. long, 1½ in. broad, rather densely covered on the dull green upper surface with an adpressed yellowish somewhat silky pubescence, and with a dense hoary somewhat silky pubescence beneath; petiole 9 lin. long. Flowers small, sessile, crowded in peduncled axillary hoary pubescent heads; peduncles about 1 in. long; heads about 1 in. in diam.; bracts ovate-lanceolate, acute, scarcely exceeding the sepals, 6 lin. long, rather densely hoary pubescent on the margin, laxly so on the back. Sepals like the bracts and scarcely smaller. Corolla funnel-shaped, 1 in. long; mid-petaline areas slightly pubescent.—*Ipomœa* sp., Hallier f. in Engl. Jahrb. xviii. 134.

South Central. Congo Free State: Lomami River, *Pogge*, 1215!

"In the character of the indumentum and the form of the flower-heads and their bracts this species seems nearest to *I. chrysochætia*, but is easily distinguished by its finer, softer, greyer hairs, which are denser on the under side of the leaf, and also by the smaller corolla."—Hallier f., l.c.

53. **I. galactorrhœa,** *Hallier f. in Engl. Jahrb.* xxviii. 33. A climbing tomentose herb. Branches herbaceous, subcompressed, clothed like the peduncle and petiole with tawny yellow tomentum and longer scattered spreading hairs. Leaves long-petioled, cordate, acuminate, 2¾ in. long, 2½ in. broad, dull dark green above, and clothed with a somewhat hoary adpressed pubescence, and with dense white arachnoid hairs beneath; nerves light yellowish-green; petiole 1½ in.

long. Flowers small, subsessile in long-peduncled axillary heads, clothed with a whitish tomentum; peduncles strong, often bent, up to 4 in. long; bracts small, ovate-lanceolate, acute, margin white, densely dotted with black glands; the two outer bracts 5 lin. long by 1½ lin. broad. Sepals ovate-lanceolate, subequal like the bracts but a little smaller, about 3 lin. long and 1 lin. broad. Corolla funnel-shaped, 8 lin. long, clothed with white woolly hairs outside below the lobes. Capsule globose, densely pubescent.

Upper Guinea. Cameroons: Yaunde, *Zenker*, 651.

Very nearly allied to *I. Wightii* and *I. elythrocephala*, but easily distinguished by the smaller bracts, sepals, and corolla. Also characterised by the dense black glandular dots on the bracts and sepals.

54. **I. elythrocephala,** *Hallier f. in Engl. Jahrb.* xviii. 134. Stems slender, widely climbing, more or less densely covered, especially on the younger parts, with long spreading tawny hairs. Leaves cordate-ovate, shallowly palmately 3–5-lobed, 1½–3 in. long and broad, green and thinly hairy above, matted with white tomentum beneath, with short adpressed tawny hairs marking out the veins; end lobe deltoid; side ones rounded below, more or less coarsely dentate above; petiole as long as the blade. Peduncle generally about as long as the subtending leaf; flowers in a dense head; bracts small, linear-oblong to lanceolate, obtuse, persistent, the two lowest and largest about 6 lin. long, mottled like the leaves with white tomentum beneath, margin and lower portion of back bearing the characteristic yellow-brown stiffish hairs; sepals linear-lanceolate, subacute, barely 6 lin. long, hairy like the bracts; corolla funnel-shaped, 2 in. long, 1½–2 in. in diam. at the throat; midpetaline areas with short soft woolly hairs; fruit and seeds not seen.—Hallier f. in Comptes-Rendus Soc. Bot. Belg. xxxvi. 81 (*elytrocephala*), and in Bull. Soc. Bot. Belg. xxxvii. 94; Henriq. in Bull. Soc. Brot. xvi. 68; Hiern in Cat. Afr. Pl. Welw. i. 735.

Lower Guinea. Lower Congo: Bingila, *Dupuis*. Angola: Golungo Alto, Camilungo, *Welwitsch*, 6184! near Ndelle, *Welwitsch*, 6185! Canaula, *Welwitsch*, 6183!

South Central. Congo Free State: by the Lomami River, *Pogge*, **1142!** Angola: Lunda; between the River Luachim and Quikimbo, *Marques*, 329.

55. **I. Wightii,** *Choisy in DC. Prodr.* ix. 364. Perennial. Stems slender, twining, clothed with dense short brownish hairs. Leaves cordate-ovate, more or less shallowly 3-lobed, 2–4 in. long and broad, green and more or less hairy above, hairs short, adpressed, clothed with white tomentum beneath, the veins marked out with stiffish yellowish adpressed hairs; side lobes rounded; end lobe deltoid, all entire; petiole hairy, 1–2 lin. long. Peduncle 1–3 in. long, hairy like the stem; flowers in a dense head; bracts lanceolate, 6 lin. long, white beneath, back minutely hirsute with short yellowish hairs, sides and margins glandular hairy. Calyx hairy like the bracts. Sepals linear-lanceolate, acute, 6 lin. long. Corolla rose-red, funnel-shaped, 1–1½ in. long; throat 1–1½ in. in diam. Capsule small, globose, fragile, pubescent. Seeds glabrous, thinly white-

spotted.—Wight, Ic. t. 1364; Klotzsch in Peters, Reise Mossamb. Bot. 239; Hallier f. in Engl. Jahrb. xviii. 133 and xxviii. 32. *I. arachnoidea*, Bojer, Hort. Maurit. 228; Choisy in DC. Prodr. ix. 364. *Convolvulus Wightii*, Wall. Pl. Asiat. Rar. t. 171.

Nile Land. Uganda, 4000–7500 ft.; Kaviroudo: Nandi and neighbourhood, *Whyte!* Eldama Ravine and Mau, *Whyte!* Busoga Villages, *Whyte!* second and third days' march from Mumias, *Whyte!* Near Chulema, *Bagshawe*, 362! British East Africa: Waturuma (Duruma), *Kässner*, 142! Nairobi, *Percival!*

Mozamb. Dist. Zanzibar, *Bojer!* German East Africa: Ugweno Mountain, near Kilimanjaro, *Volkens*, 507! Usambara, *Holst*, 333. Portuguese East Africa: Zambesi, *Stewart!* Shupanga, *Kirk!* Rios de Sena, *Peters!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, (1088 ?)! Nyasaland; Mount Chiradzulu, *Whyte!* Rhodesia: Bulawayo, *Rand*, 555!

Also in South Africa, Madagascar, Natal, and Tropical Asia.

56. **I. garckeana,** *Vatke in Linnæa*, xliii. 512. Stems terete, clothed on the upper part with adpressed hairs. Leaves cordate, 3-lobed, up to $1\frac{1}{2}$ in. long and $1\frac{3}{4}$ in. broad, green and adpressed hairy above, clothed with white tomentum beneath; lateral lobes obtuse; terminal emarginate and mucronate, all crenate; petiole up to $2\frac{1}{2}$ in. long. Peduncle sparsely pilose, 7 in. long. Flowers about six in a dense head; bracts linear, from a broader base, subacute, long-hairy like the sepals. Sepals unequal, linear-subulate, subacute, above 8 lin. long. Corolla funnel-shaped, white with a purple throat, nearly an inch long and broad. Fruit and seeds unknown.—Hallier f. in Engl. Jahrb. xviii. 134.

Nile Land. British East Africa: Duruma; Tchamtei, *Hildebrandt*, 2344.

57. **I. whyteana,** *Rendle.* Stem rather woody, long prostrate, tinged with red, shortly strigose, hairs whitish or with a faint yellow tinge. Leaves uniform in outline, deeply trilobed, about 6 lin. long by 1 in. or a little more broad, margin crenate, end lobe with retuse and mucronulate margin, and rounded sides, lateral lobes sub-orbicular; upper surface rather densely strigose, lower surface covered with a dense white tomentum except on the veins which stand out as brown lines bearing short yellowish white hairs; petiole slender, 1 in. long or less, hairy like the stem and peduncles. Peduncles axillary, longer than the leaves, about 2 in. long, bearing small dense hairy capituliform cymes, 6–8 lin. in diam. Bracts lanceolate, abruptly acuminate, the outer about 3 lin. long, the back and margin bearing long whitish or yellowish-white hairs. Sepals lanceolate to linear-lanceolate, acuminate, herbaceous with margins colourless, back and margins densely hairy like the bracts, 4 lin. long, the outermost and broadest a little over 1 in. broad. Corolla withered, apparently about 1 in. long, funnel-shaped, purple. Style with a large swollen base forming a cap on the ovary; ovary 2-celled; ovules 4.

Nile Land. British East Africa: between Mombassa and Lamu, *Whyte!*

58. **I. Pes-tigridis,** *Linn. Sp. Pl. ed.* 1, 162. Annual. Stems slender, twining, hirsute with long spreading yellowish hairs. Leaves

palmately 7–9-lobed, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{3}{4}$–$3\frac{1}{4}$ in. broad; lobes narrowly oval, narrowing to the base and subacute apex, rather thinly hairy on both surfaces; hairs stiffish, long, adpressed; petiole about as long as the blade, hairy like the stem and peduncle. Peduncles longer than the petioles, bearing dense hirsute few-flowered bracteate heads. Bracts foliaceous, oblong to oblong-lanceolate, dorsally hirsute, especially in the lower part; the two outer the largest, up to 1 in. long, sometimes 3 lin. broad, generally narrower. Sepals lanceolate, hairy like the bracts, 4–5 lin. long. Corolla funnel-shaped, purple, about $1\frac{1}{2}$ in. long; mid-petaline areas bearing a few of the characteristic long stiffish hairs. Capsule brown, glabrous. Seeds black, shortly pubescent.—Choisy in DC. Prodr. ix. 363; Klotzsch in Peters, Reise Mossamb. Bot. 239; Hallier f. in Engl. Jahrb. xviii. 134; and in Engl. Jahrb. xxviii. 34 (excluding subvarieties); var. *africana*, Hallier f. in Bull. Herb. Boiss. vi. 539 partly, and in Ann. Istit. Bot. Roma, vii. 230.

Nile Land. Kordofan, *Pfund*, 115! Somaliland: Berbera, *Robecchi-Brichetti*, 480. British East Africa: North of Mombassa, *Whyte!* Ribe, *Wakefield!*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1347! German East Africa: Usambara; Mkulumusi River, near Tanga, *Kässner*, 17! Amboni, *Holst*, 2597! Usaramo; Dundo, *Stuhlmann*, 6450; Udge, *Vogel*, 15! Rovuma River, *Meller!* Portuguese East Africa: Mozambique, *Peters*. Lower Zambesi; Shupanga, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1089*a*!

Also in Mauritius and Tropical Asia.

Var. *longibracteata*, Vatke in Linnæa, xliii. 512.—Bracts very long and narrow, linear tending to linear-lanceolate or oblanceolate, strongly ciliate below the middle, the two outer $\frac{3}{4}$ to $1\frac{1}{2}$ in. long, generally less than 2 lin. broad. Corolla large, more than 2 in. long.—Hallier f. in Ann. Istit. Bot. Roma, vii. 230 (as subvar.), in Engl. Jahrb. xxviii. 34. *I. lophantha*, Hallier f. in Engl. Jahrb. xviii. 134.

Nile Land. Somaliland: Araccio, by the River Dana, *Riva*, 1279; and without precise locality, *Donaldson-Smith*, 376! British East Africa: Taita; Ndara Plain, *Hildebrandt*, 2420!

Mozamb. Dist. German East Africa: Ugogo forest, *Hannington*! near Masinde, *Holst*, 3881; Usagara; Mpwapwa, 3200 ft., *Stuhlmann*, 233; and without precise locality, *Fischer*, 419.

Var. *strigosa*, Hallier f. in Engl. Jahrb. xxviii. 34 (as subvar.).—Whole plant more densely hirsute; stems robust, nearly 2 lin. thick, prostrate, widely creeping. Bracts large, hairy like the leaves, the two outer and larger oblong-spathulate, over 1 in. long, 5 lin. broad in the upper half, the inner lanceolate. Corolla whitish-rose.—Hiern in Cat. Afr. Pl. Welw. i. 735 (as var. *africana*, Hallier f.).

Lower Guinea. Angola: Huilla; about Lopollo, in fields of maize and *Arachis hypogæa*, *Welwitsch*, 6119! and without precise locality, *Antunes*, 153.

59. **I. hederacea,** *Jacq. Collect.* i. 124; *Ic. t.* 36. Annual. Stems slender, hairy, twining, hairs spreading. Leaves cordate-orbicular or cordate-ovate, acute, usually shallowly 3-lobed, membranous, hairy, $1\frac{1}{2}$–5 in. wide; petiole about as long as the blade. Peduncle 1–5-flowered, about as long as the petiole; pedicels short; bracts small, linear. Calyx hairy, $\frac{3}{4}$–1 in. long; sepals lanceolate, with a long narrow point, lower broader portion generally long-hairy, narrower upper part sparsely and short-hairy. Corolla funnel-shaped, usually

lilac, 2–3 in. long; limb 2 in. in diam. Capsule small, subglobose, 3-celled. Seeds 6, smooth. — *Ipomœa Nil*, Roth, Cat. Bot. i. 36; Hallier f. in Engl. Jahrb. xviii. 136. *I. scabra*, Forsk. Pl. Ægypt.-Arab. 44. *I. githaginea*, Hochst. in herb. un. itin. 1842, no. 784. *Convolvulus Nil*, Linn. Sp. Pl. ed. 2, 219; Bot. Mag. t. 188. *Pharbitis hederacea*, Choisy in Mém. Soc. Phys. Genèv. vi. 440 (Conv. Or. 58), and in DC. Prodr. ix. 344. *P. Nil*, Choisy l.c. 343; Capua in Ann. Istit. Bot. Roma, viii. 229. *P. hispida*, A. Rich. Tent. Fl. Abyss. ii. 65, not of Choisy; Engl. Hochgebirgsfl. Trop. Afr. 346. *P. purpurea*, Aschers. in Schweinf. Beitr. Fl. Aethiop. 96 excl. syn. *P. githaginea*, Hochst. in herb. un. itin. 1844, no. 1446.

Upper Guinea. Cape Coast Castle, *Brass!* Lagos, *Rowland! Punch*, 39! Northern Nigeria: Nupe; Jeba, *Barter!* Quorra (Niger), *Vogel*, 125! Fernando Po, *Buchholz.*

Nile Land. Eritrea: Lalamba Mountain, *Steudner*, 938! Keren, *Steudner*, 946. Assaorta, *Pappi*, 3012. Gallabat: Matamma, *Schweinfurth*, 513! 2165! 2157. Abyssinia: by the River Tacazze, *Schimper*, 784! Mai Mezano Valley, *Schimper*, 1446! Schahagenne, 5500 ft., *Schimper* (*Schweinfurth* ex *Hallier*), 365! Zana Lake, 6200 ft., *Schimper*; Gageros, 4200 ft., *Schimper*, 65, 2176! Wady Woina, *Rohlfs & Stecker.* Kordofan, *Kotschy*, 46! *Cienkowsky*, 366.

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 1021; near Lemfu, *Butaye.*

South Central. Congo Free State: Bena Moulengere, *Dewèvre*, 1011.

Widely spread throughout the tropics.

Var. *inæqualis*, Baker & Rendle.—Outer sepals ovate-oblong, shortly acuminate or subobtuse, the inner narrower acuminate.—*S. githaginea*, var. *inæqualis*, Beck in Paulitschke, Harar, 456.

Nile Land. Somaliland: Mount Hakim, near Harar, *Hardegger & Paulitschke.*

60. **I. erioleuca,** *Hallier f. in Engl. Jahrb.* xxviii. 33. A climbing tomentose herb; branches woody, with two rows of long white hairs, almost as in *I. velutipes*. Leaves broadly cordate, acuminate, 2½–5 in. long, 2–3½ in. broad, glabrous on the upper surface, covered with white tomentum beneath, palmately veined at the base, penninerved above, nerves rather prominent on the lower face; petiole ¾–1⅓ in. long, thinly hoary tomentose beneath, with spreading yellowish stiffish hairs above. Peduncles axillary, strong, straight, thinly hoary tomentose, 2–3 in. long, bearing a terminal flower and a pair of shortened cincinni; bracts small, ovate-lanceolate, long acuminate, about 3 lin. long and 1½ lin. wide at the auricled subamplexicaul base, sparsely hoary puberulous beneath; bracteoles similar but successively smaller, spreading; flowers obviously pedicelled. Sepals ovate-lanceolate, acute, 4 lin. long, subequal, the outer 1½–2 lin. long, hoary puberulous especially in the middle line. Corolla probably purple, funnel-shaped, 1¼ in. long, about 1 in. broad.

South Central. Angola: Lunda; in shady valleys near the River Luachim, *Marques*, 329.

61. **I. ficifolia,** var. **laxiflora,** *Hallier f. in Sitzungsber. Akad. Wiss. Wien. Math. Naturwiss. Cl.* cvii. 48. Stem climbing, clothed with spreading golden hairs. Leaves cordate-ovate, 3-lobed, reaching 3–3½ in. long, nearly as broad, with longish adpressed hairs above and white tomentum beneath, except on the veins which bear longer adpressed yellow hairs; petiole slender, shorter or sometimes longer than the blade, hairy like the stem and peduncles. Cymes laxly many-flowered, much-branched, long-peduncled; bracts small, subulate, hairy. Sepals equal, linear-lanceolate, 3–4 lin. long, clothed with golden hairs. Corolla rose-red, 2 in. in diam. Capsule globose, 4 lin. in diam. Seeds pilose.—Hallier f. in Engl. Jahrb. xxviii. 35, and in Ann. Istit. Bot. Roma, vii. 230 (subvar. *auriculata*). *I. engleriana,* Dammer in Engl. Pfl. Ost-Afr. C. 333.

Nile Land. Somaliland: in cold dense woods at Dadacci Uteci, *Riva,* 1208. British East Africa: Liani, 400 ft., *Kässner,* 338 !

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, 2500 ft. *Holst,* 8721 ! Bote (Buiti ?) *Kässner,* 88 ! Usaramo; Ukwere, *Stuhlmann,* 106.

62. **I. Kilimandschari,** *Dammer in Engl. Pfl. Ost-Afr. C.* 332. Stem slender, climbing, hairy, hairs yellowish, spreading. Leaves long-petioled, cordate-ovate, 2–4 in. long and nearly as broad, acute or shortly acuminate, sometimes subobtuse and mucronate, crenate, clothed with adpressed deciduous yellow hairs above and with white floccose tomentum beneath; petiole slender, about as long as the leaf. Peduncle up to 3 in. long; flowers in small congested cymes; bracts a little shorter than the sepals, lanceolate, bearing on the back stiffish yellow hairs, flanks and margin glandular. Sepals lanceolate-acuminate, under 6 lin. long, hairy and glandular like the bracts. Corolla 1½ in. long. Buds hairy at the tip.—Rendle in Journ. Bot. 1901, 21. *I. ficifolia,* var. *laxiflora,* subvar. *pariflora,* Hallier f. in Engl. Jahrb. xxviii. 35.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5000 ft., *Volkens,* 577 ! above Morang (Marangu), *Taylor !*

63. **I. pilosa,** *Sweet, Hort. Brit. ed.* 1, 289. Perennial. Stems slender twining, minutely hirsute with rather long spreading yellowish-white hairs. Leaves cordate-ovate, acute, membranous, 2–4 in. long and broad, palmately trilobed, green and thinly hairy above, covered with thin white tomentum beneath; petiole as long as or longer than the leaf, slender, hairy like the stems and peduncles. Peduncles slender, 1–2 in. long; flowers laxly cymose; pedicels short; bracts small, shorter than the sepals, persistent, ovate-acuminate with auricled base, minutely hirsute with the characteristic yellow hairs and glandular margins. Calyx hairy and glandular like the bracts; sepals ovate-acuminate, 5–7 lin. long. Corolla purplish-white, funnel-shaped, 1 in. long, the expanded limb under 1 in. in diam. Capsule globose, fragile, hairy; seeds glabrous.—Choisy in DC. Prodr. ix. 363; Wight, Ic. t. 837; Hiern in Cat. Afr. Pl. Welw. i. 735. *I. dichroa,* Hochst. in Pl. Schimp. Abyss. ii. no. 820; Choisy, l.c. 364; A. Rich. Tent. Fl.

Abyss. ii. 68; Vatke in Linnæa, xliii. 513; Schweinf. Beitr. Fl. Aethiop. 95; Engl. Hochgebirgsfl. Trop. Afr. 345; Hallier f. in Engl. Jahrb. xviii. 136; Capua in Ann. Istit. Bot. Roma, viii. 225. *I. calophylla*, Fenzl in Kotschy, Pl. Nub. no. 93, and in Flora, 1844, 312. *I. arachnosperma*, Welw. Apont. Phyto-geogr. 588.

Upper Guinea. Senegal: *Roger!* Gambia, *Ingram!*

Nile Land. Nubia: Berber, *Kotschy*, 324; Sennar, *Husson*. Kordofan, *Kotschy*, 93! 417! *Pfund*, 357, 507. Eritrea: Keren, *Steudner*, 939! East of Amba-Tokhan, 1300 ft., *Schweinfurth & Riva*, 605! Samhar, *Ragazzi*, 295. Assaorta *Terracciano & Pappi*, 16; Zaga-Tata, *Pappi*, 2892; Tata-Farras, *Pappi*, 2955; Ginda, *Ragazzi*, 137; Damas Valley, *Pappi*, 4130; Aidereso Torrent, *Pappi*, 4232; Ambatocam, *Pappi*, 4044; Habab, *Hildebrandt*, 503; Shohos, *Ehrenberg*. Abyssinia: River Tacazze, *Schimper*, 1685; Schahagenne, 16000 ft., *Schimper*, 362*a*; and without precise locality, *Schimper*, 820! Gallabat: near Matamma, *Schweinfurth*, 2139! Upper White Nile, *Harnier*.

Lower Guinea. Angola: Loanda, Maianga do Povo, *Welwitsch*, 6243! near Quicuxe, *Welwitsch*, 6244! Loanda, *Gossweiler*, 786!

Mozamb. Dist. Portuguese East Africa: Lupata, *Kirk!* Shiramba, *Kirk!* Morambala, *Waller!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1088! Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Shire River, *Kirk!* and without precise locality, *Buchanan*, 1409! Ngamiland; Kwebe Hills, 3300 ft., *Mrs. Lugard*, 223!

64. **I. pharbitiformis,** *Baker in Kew Bulletin*, 1895, 291. Stem slender, climbing, pubescent. Leaves shortly petioled, cordate-ovate, 2–3 in. long, acute, entire, green and thinly pilose above, clothed with a pale brown tomentum beneath; petiole 4–8 lin. long, with a double line of pale brownish soft spreading hairs. Cymes shortly peduncled, 5–6-flowered; pedicels short, over 1 in. long; bracts large, ovate-lanceolate, acuminate, with white hairs on the back and glandular margin. Sepals equal, ovate-lanceolate, acute, $4\frac{1}{2}$ lin. long, hairy and glandular like the bracts. Corolla bright red, $1\frac{1}{2}$ in. long; limb scarcely lobed, 15–18 lin. in diam. Stamens short, inserted near the base of the corolla-tube.

Mozamb. Dist. British Central Africa: near Lake Moero, *Carson*, 41!

65. **I. magnusiana,** *Schinz in Verhandl. Bot. Ver. Prov. Brandenb.* xxx. 272. Stems slender, twining, thinly clothed with adpressed whitish hairs. Leaves orbicular in general outline, $1\frac{1}{2}$ in. in diam., green and slightly pubescent above, clothed with white tomentum beneath (veins brownish), cut down to the base into 5–7 oblong or lanceolate, obtuse or subacute, minutely cuspidate segments; petiole 1–$1\frac{3}{4}$ in. long. Flowers 1–2 on a long slender peduncle, longer than the leaf and hairy like the stem; bracts 2 lin. long; pedicels very short. Sepals lanceolate, acuminate, barely 6 lin. long, densely covered with short hairs. Corolla funnel-shaped, reddish, 6 lin. long. Capsule globose, 4 lin. in diam. Seeds covered with a white pubescence.—Hallier f. in Engl. Jahrb. xviii. 135.

Lower Guinea. German South-west Africa: Amboland; Oshiheke, *Schinz*, 752! and without precise locality, *Baines!*

Mozamb. Dist. Ngamiland: Kwebe, very common, *Lugard*, 119! 3400 ft., *Mrs. Lugard*, 135!

Also in Bechuanaland.

66. **I. Lugardi,** *N. E. Brown.* Stem twining, pubescent with short and long yellowish spreading hairs intermingled. Leaves petiolate, palmately 5-lobed, cordate at the base, green and pilose above, densely white tomentose beneath except on the principal veins; lobes 1–2 in. long, 4–13 lin. broad, lanceolate, very acute or acuminate, basal lobe either gibbous or produced into a short rounded lobule at the base; petiole up to 2 in. long, hairy like the stem. Peduncles $\frac{1}{2}$ to $2\frac{1}{2}$ in. long, hairy like the stem, 1–3-flowered; pedicels very short. Bracts lanceolate, tapering upwards into a long linear point, 4–8 lin. long, with long spreading hairs like the sepals. Sepals lanceolate, tapering into a long linear apex, 6–8 lin. long, the outer much broader than the inner (up to 2 lin.), back and margin with the characteristic long spreading hairs. Corolla funnel-shaped, 1–$1\frac{1}{4}$ in. long and about as broad, mauve-pink; midpetaline areas well-defined, hairy. Fruit and seed not seen.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe Hills, 3300 ft., *Mrs. Lugard*, 211! Eastern Bamanguato Territory; between Henry's Vley and Tamasetze, *Holub*, 1062! northern Kalahari, desert, near T'Klakane Pits, *Lugard*, 226!

Var. *parviflora,* Rendle. Bracts and sepals shorter and less hairy, the former not exceeding 4 lin., the latter 5 lin. long. Corolla 9 lin. long.

Mozamb. Dist. Matabeleland, *Elliott!*

67. **I. Eenii,** *Rendle in Journ. Bot.* 1901, 21. Stem slender, climbing, clothed with whitish (or when young yellowish) hairs. Leaves shortly petioled, palmately tripartite; lobes lanceolate or oblong lanceolate, acute, the central one 1 in. long, 4 lin. broad; upper surface and veins beneath clothed with yellowish hairs. Peduncle 1 in. long, 1–2-flowered; bracts lanceolate, placed near the calyx. Sepals lanceolate-acuminate, 6 lin. long, the three inner narrower than the two outer. Corolla funnel-shaped, 1 in. long. Filaments 3–4 lin. long.

Lower Guinea. German South-west Africa: Damaraland, *Een!*

68. **I. kentrocarpa,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 70. Stems slender, wide climbing, pubescent, as are also the petioles and peduncles, striate and rugulose. Leaves cordate-ovate, entire, 1–$3\frac{1}{2}$ in. long, $\frac{3}{4}$–$2\frac{3}{4}$ in. broad, acuminate, apex weakly mucronate, membranous, glabrescent on the upper surface, lower surface paler and shortly pubescent, especially on the main veins; petiole as long as or shorter than the blade. Peduncle slender, varying very much in length, sometimes very short, rarely exceeding the leaves, 1- to many-flowered; flowers laxly corymbose; bracts and bracteoles minute, ovate to lanceolate; pedicels thickening upwards, generally about 6 lin. long, glabrescent. Sepals small, subequal, ovate, obtuse, sometimes mucronulate, glabrous, $2\frac{1}{2}$–3 lin. long. Corolla funnel-shaped, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, yellow

with a dark purple eye at the base of the tube, glabrous. Capsule globose-conical, glabrous, about 6 lin. long and 5 lin. in diam., tipped with the persistent hard style-base. Seeds large, dirty brown, pulverulent, $2\frac{1}{2}$ lin. long.—Hallier f. in Engl. Jahrb. xviii. 139 and xxviii. 41; Rendle in Journ. Bot. 1901, 55; Capua in Ann. Istit. Bot. Roma, viii. 225. *I. ochracea*, Hiern in Cat. Afr. Pl. Welw. i. 737, as to Nos. 6174–6, not of Don. *I. ophthalmantha*, Hallier f. in Engl. Jahrb. xviiii. 141 partly.

Upper Guinea. Senegambia: near Rio Nunez, *Heudelot*, 868. Sierra Leone: Bananas and Camarancas, *Afzelius*; near Kambia, *Scott-Elliot*, 4367! Kakuna, *Scott-Elliot*, 4679! Togo: Bismarckburg, *Büttner*, 391; Misahöhe, *Baumann*, 427. Lagos, interior, *Rowland*; Ikirun, *Millson!* and without precise locality, *Mortensen*.

Nile Land. Eritrea: Mensa, 4500–6000 ft., *Terracciano & Pappi*. Keren, *Steudner*, 948! Abyssinia: near Dochli, *Schimper*, 1420! Schahagenne, *Schimper*, 368! Alia Amba, *Roth*, 421! Uganda: between Nandi and Mumias, 4400 ft., *Whyte*! British East Africa: Kikuyu; Kidung (Kedang), *Scott-Elliot*, 6526!

Lower Guinea. Angola; Ambriz; near Quibanga, *Welwitsch*, 6174! Golungo Alto; by the Ambaca road, *Welwitsch*, 6175! and Menhalula, *Welwitsch*, 6176!

South Central. Congo Free State: Lomami River, *Pogge*, 1216; valley of the Mukalue, a tributary of the Lubudi; between Samba and Lake Mussolo, and at Mtowa, *Descamps*.

Mozamb. Dist. German East Africa: Ugalla River, *Böhm*, 253. British Central Africa: Nyasaland; Blantyre, *Buchanan*, 12!

I. acutiflora, A. Rich. Tent. Fl. Abyss. ii. 71 may be a synonym of this species.

69. **I. obscura,** *Ker in Bot. Reg. t.* 239. Annual? Stems slender, twining, more or less pubescent. Leaves cordate-ovate, acute, membranous, green and obscurely pubescent on both surfaces, $1\frac{1}{2}$–2 in. long and broad; petiole 1–2 in. long. Peduncle short, 1–3-flowered; pedicels thickened, $\frac{1}{2}$–1 in. long; bracts ovate, minute. Calyx glabrous or sometimes hairy, $2\frac{1}{2}$–3 lin. long; sepals ovate, acute, equal. Corolla funnel-shaped, 1 in. long, white with a purple base; limb 1–$1\frac{1}{2}$ in. in diam. Capsule globose, glabrous, 4 lin. in diam. Seeds pubescent. —Choisy in DC. Prodr. ix. 370; Kotschy & Peyr. Pl. Tinn. 24; Engl. Hochgebirgsfl. Trop. Afr. 345; Franchet, Sert. Somal. 41; Hallier f. in Engl. Jahrb. xviii. 140, and xxviii. 38 (var. *abyssinica*); in Jahrb. Hamb. Wissensch. Anst. xv. 44, and in Ann. Istit. Bot. Roma, vii. 230; Baker & Wright in Dyer, Fl. Cap. iv. ii. 62; Capua in Ann. Bot. Istit. Roma, viii. 226. *I. saltiana*, Rendle in Journ. Bot. 1894, 178. *Convolvulus gonatodes*, Steud. in Schimper, Herb. Abyssin. 801. *C. pilosus*, R. Br. in Salt Abyss., App. lxiv.

Nile Land. Eritrea: Dahlak Archipelago, Hotha, *Terracciano*, 346; below Gheleb, 5000 ft., *Schweinfurth*, 1486; Acrur, 600 ft, *Schweinfurth & Riva*, 1005! Dogali, *Terracciano & Pappi*, 31; Emberemi, *Pappi*, 1149; Sabarguna, *Ragazzi*, 292; Habab, *Terracciano & Pappi*, 652, 753, 813; *Hildebrandt*, 502; Assaorta, *Terracciano*, 50; Ghedem Mountain, *Terracciano & Pappi*, 6; Mensa, 6000–8000 ft., *Terracciano & Pappi*, 1594, 1595, 881, 1072, 1457, 1156; near Keren, *Steudner*, 948! Ginda, 3300 ft., *Ragazzi*, 136. Abyssinia: Worrhey district, 16,000 ft., *Schimper*;

Schahagenne, 16,000 ft., *Schimper*, 368! near Gapdia, *Schimper*, 801! and without precise locality, *Salt!* Togodele, *Ehrenberg*. Nubia: between Atbara and the Red Sea, *Schweinfurth*, 2173! Banks of the White Nile, *Petherick!* Somaliland: Wagga Mountain, Hammer and Sheik Pass, *Mrs. Lort Phillips!* Hammer, *Miss Cole!* Soksoda, *Gillett!* Harar, *Hardegger*: Laku, *Keller*, 232; Vallota del Web, *Riva*, 1008; Milmil, *Riva*, 1060; Banas, *Riva*, 1445; Darar, *James & Thrupp!* and without precise locality, *Donaldson Smith!* Lake Marsabit, *Delamere!* Uganda: Mau, 7000 ft., *Scott-Elliot*, 6851! British East Africa: Kikumbuliu, *Scott-Elliot*, 6263! Majarini, near Mambrui, *Hardegger & Paulitschke*.

Mozamb. Dist. Zanzibar: *Hildebrandt*, 979! German East Africa: Lower plateau, north of Lake Nyasa, *Thomson!* Bukumbi, on the Victoria Nyanza, *Stuhlmann*, 796; near Ujiji, *Scott-Elliot*, 8364! Salt River, *Pospischil;* and without precise locality, *Fischer*, 420. British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Rhodesia, near Buluwayo, *Rand*, 604!

Also in Natal, the Mascarene Islands, India, Malaya, and Australia.

70. **I. fragilis,** *Choisy in DC. Prodr.* ix. 372 *in an extended sense.* (*Hallier f.*) Stems very slender, twining, glabrous or sparsely pilose. Leaves rather narrowly cordate-ovate, acuminate, apex mucronulate, membranous, 1–1¾ in. long, barely 6–9 lin. broad; petioles slender, a little shorter than the leaf. Flowers solitary or geminate, axillary, on long slender peduncles which often exceed the leaves; bracts small, narrowly acuminate, 1 lin. or more long; pedicels varying in length, shorter than the peduncle. Sepals oblong to ovate, acute, 3 lin. long, glabrous or sparsely hairy. Corolla whitish, or buff-yellow, funnel-shaped, glabrous, ¾–1 in. long. Capsule glabrous. Seeds puberulous. —Hallier f. in Bull. Herb. Boiss. vii. 50 (var. *glabra*), and in Bull. Soc. Bot. Belg. xxxvii. 95.

Upper Guinea. Cameroons: Ngaumdere, 4000 ft., *Passarge*, 160; Western Lagos, *Rowland*.

Nile Land. Abyssinia: Western Bongo, *Heuglin*, 38. Jur: Jur Ghattas, *Schweinfurth*, 2348! 2365! Niamniam: Nabambisso River, *Schweinfurth*, 3148! Bahr-el-Ghazal; Fort Fatiko, *Baker*, 79.

Lower Guinea. Lower Congo: *Burton!* Angola: Malange, *Gossweiler*, 1108! *Buchner*, 95; *Mechow*, 176; Huilla, *Antunes*, A 86, A 149; *Newton*, 129. German South-west Africa: Damaraland: *Rehmann;* Hereroland: Otyimbingue, *Schinz*, 2060 partly; from Walfisch Bay to Okahandya and Otyitambi, *Luederitz;* Oshando, *Schinz*; Okombahe, *Guerich*, 54.

Var. *pubescens*, Hallier f. in Bull. Herb. Boiss. vii. 51. Leaves (at any rate the younger) densely or laxly adpressed pubescent beneath or on both surfaces. Stems, petioles, peduncles, pedicels and sepals patulous-hirsute.—*I. afra*, Choisy in DC. Prodr. ix. 380. *I. longipes*, Engl. in Engl. Jahrb. x. 246. *I. inconspicua*, Baker in Kew Bulletin, 1894, 71.

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Fleck*, 524. Hereroland: Otyimbingue, *Schinz*, 2060 partly; between Kinsep and Fallgrass, *Fleck*, 409; Kurumanas, *Fleck*, 554.

South Central. On the Kuito River, between Kutue and Sobi, 4000 ft., *Baum*, 754!

Mozamb. Dist. German East Africa: Lower plateau north of Lake Nyasa. *Thomson!* British Central Africa: Nyasaland: Mount Mlanji and Zomba, *Whyte!* Nakalambe, *Buchanan*, 179! Rhodesia: Buluwayo, *Rand*, 603! Salisbury, *Mrs. Evelyn Cecil*, 75! Matabeleland, *Oates!*

71. **I. ochracea,** *G. Don, Gen. Syst.* iv. 270. Perennial. Stems very slender, twining, younger parts sparsely hairy to subglabrous, the older longitudinally rugose-striate. Leaves cordate-ovate, acute, entire, membranous, glabrescent or obscurely pubescent, 1–2½ in. long; petiole a little shorter than the blade. Peduncles 1–3-flowered, ½–2 in. long; bracts minute, ovate, acuminate; pedicels shorter than the peduncle, 4–9 lin. long. Calyx sparsely hairy, glabrous, 3 lin. long; sepals ovate, acute. Corolla funnel-shaped, 1½ in. long, bright yellow with a purple tube. Capsule subglobose, tipped with the persistent style-base, glabrous. Seeds pubescent.—Choisy in DC. Prodr. ix. 372; Hallier f. in Engl. Jahrb. xviii. 140 and xxviii. 37, in Bull. Herb. Boiss. vi. 540, and in Bull. Soc. Bot. Belg. xxxvii. 95; Hiern in Cat. Afr. Pl. Welw. i. 737 (as to No. 6245); Rendle in Journ. Bot. 1901, 55. *I. ophthalmantha*, Hallier f. in Engl. Jahrb. xviii. 141 as to Welw. No. 6245. *Convolvulus ochraceus*, Lindl. in Bot. Reg. t. 1060. *C. trichocalyx*, Schumach. in K. Dansk. Vid. Selsk. Afhandl. iii. 111, and in Schumach. & Thonn. Beskr. Guin. Pl. 91.

Upper Guinea. Guinea: *Isert, Thonning.* Togo: near Lome, *Warnecke*, 207!

Lower Guinea. Congo: *Smith!* Lower Congo: Boma, *Dupuis, Dewèvre*, 128! Loango, *Soyaux*, 66. Angola: Ambriz, *Monteiro!* Loanda, *Welwitsch*, 6245! *Gossweiler*, 295! 1483! Chella Mountains, *Johnston!* Penedo, *Gossweiler*, 1537!

72. **I. micrantha,** *Hallier f. in Bull. Herb. Boiss.* vi. 541. A climbing herb with slender terete thinly pilose or glabrescent stems. Leaves cordate, entire, glabrous, up to 2¾ in. long by 2 in. broad, with an acuminate mucronulate apex, basal sinus broad; lobes rounded; petiole nearly as long as the blade, filiform. Peduncles axillary, terete, filiform, glabrous, strictly erecto-patent, sometimes longer (up to nearly 2 in.) and many-flowered, sometimes shorter and few-flowered or obsolete. Bracts and bracteoles minute squamiform, glabrous. Pedicels about 6 lin. long, filiform, glabrous, thickening somewhat upwards, strongly recurved after flowering. Buds ovoid, subobtuse. Sepals small, subequal or the two outer a little shorter, about 1½ lin. long, ovate-elliptic, obtuse, mucronulate, herbaceous, glabrous, minutely rugose, subverruculose on the back, margin membranous and paler. Corolla funnel-shaped, whitish-yellow, glabrous, about 1 in. long; tube about 2½ lin. broad in the middle; limb nearly 1 in. in diam. Capsule globose, tipped with the style-base, glabrous, 2-celled, about 4 lin. long. Seeds 4, dark-coloured glabrous.—*I. micrantha*, var. *glabrata*, Hallier f. l.c. 542.

Upper Guinea. Ashanti: Kumassi, *Cummins*, 236! Cameroons: Yaunde, *Zenker*, 506.

Var. *hispida*, Hallier f. l.c. 542. Bracteoles and calyces hispid with fine grey spreading hairs.—Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 96.

Lower Guinea. Lower Congo: Lemba, *Dewèvre*, 357; Bingila, *Dupuis*; Kisantu, *Gillet*, 899.

73. **I. acanthocarpa,** *Hochst. in Kotschy, Pl. Nub. Exsicc.* 269. Perennial. Stems slender, twining, glabrous, longitudinally striate. Leaves cordate-ovate, entire, acute, membranous, glabrous, 1¼–3 in.

long; petiole very slender, about as long as the blade. Peduncles short, 1–3-flowered; pedicels short, thickened; bracts minute, ovate, obtuse. Sepals ovate, about 3 lin. long, obtuse or minutely mucronate. Corolla regularly funnel-shaped, whitish or pale purple, 1 in. long. Capsule globose, glabrous, 4–6 lin. in diam., tipped with the sharp persistent style-base. Seeds silky.—Hallier f. in Engl. Jahrb. xviii. 139 and xxviii. 43. *Calonyction acanthocarpum*, Choisy in DC. Prodr. ix. 346.

Nile Land. Kordofan: Obeid, *Kotschy*, 269!
Upper Guinea. Senegal, *Perrottet*, 521! 524! *Lelièvre.*

74. **I. asclepiadea,** *Hallier f. in Engl. Jahrb.* xviii. 142. Stem slender, twining, glabrous. Leaves cordate-ovate, acuminate, 2 in. long, above 1 in. broad, glabrous, blackish above, paler below, prominently ribbed; margin revolute; petiole 6–9 lin. long. Peduncle about 1 in. long, rigid, glabrous; flowers many, subumbellate, in lax dichasia. Sepals small, ovate, subobtuse, blackish, cinereo-pubescent, $2\frac{1}{2}$ lin. long, by half as broad, the outer larger than the inner. Corolla funnel-shaped, 1 in. long, pubescent.—Hallier f. in Engl. Jahrb. xxviii. 43, and in Bull. Soc. Bot. Belg. xxxvii. 96.

South Central. Congo Free State: Monbuttu; Nembe, by the Kussumbo stream, *Schweinfurth*, 3141. Lomami River, *Pogge*, 1213.

75. **I. britteniana,** *Rendle in Journ. Bot.* 1896, 38. Stems slender, climbing, glabrous, longitudinally rugulose. Leaves shortly petioled, cordate-ovate, acuminate, mucronulate, 1–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. broad, glabrous, minutely glandular-punctate, scabrid and ciliate on the margins; petiole about 6 lin. long, slender, scabridulous. Cymes subumbellate, 4–7-flowered; peduncle equal to the petiole but stouter, scabridulous; bracts ovate, minute; pedicels smooth, 3–5 lin. long. Calyx thinly coriaceous, glabrous, 4 lin. long; sepals subequal, ovate, subobtuse, shortly mucronate, the outer verruculose. Corolla-tube $1\frac{1}{2}$ lin. in diam., tubular-infundibuliform, under 1 in. long. Stamens unequal, about 3 lin. long. Capsule globose, shortly apiculate, thin, brown, glabrous, 2 lin. in diam. Seeds 4, cuneiform, brown, glabrous. —Hallier f. in Engl. Jahrb. xxviii. 43.

Nile Land. British East Africa: Ngatana, by the Tana River, *Gregory!*

76. **I. Papilio,** *Hallier f. in Bull. Herb. Boiss.* vi. 543. Stems long, slender, trailing, obscurely pubescent or scabridulous. Leaves shortly petioled, cordate-ovate, acuminate, 6 lin. long, deeply and irregularly toothed in the lower half, green and glabrous on both surfaces; petiole slender, 4–6 lin. long. Peduncle short, slender, 6–9 lin. long, 1-flowered; bracteoles ovate, minute; pedicels short, thick. Sepals thinly coriaceous, unequal, ovate-elliptic, obtuse, the outer less than 3 lin., the inner barely 4 lin. long, green, glabrous. Corolla broadly funnel-shaped, rose-red, 1–$1\frac{1}{4}$ in. long, spread of limb equal to length, scarcely lobed. Stamens half the length of the corolla. Capsule globose, 4 lin. in diam.—Rendle in Journ. Bot. 1901, 56; Baker & Wright in Dyer, Fl. Cap. iv. ii. 63.

Mozamb. Dist. Rhodesia; Buluwayo, *Rand*, 365! Matoppo Hills, 4500 ft., *Eyles*, 109!

Also in the Transvaal.

77. **I. simonsiana,** *Rendle in Journ. Bot.* 1894, 178. An annual herb, branching just above the base. Stems long, diffuse, climbing, very slender, obscurely pubescent. Leaves thin, long-petioled, cordate-ovate, acuminate, coarsely dentate, 1–2 in. long and broad, sparsely pilose on both surfaces; petiole slender, generally shorter than the blade. Flowers solitary; peduncle 3 lin. long or less. Bracteoles minute, lanceolate; pedicel stouter and longer than the peduncle, about 6 lin. long. Sepals spathulate, apiculate, 3-nerved, glabrescent, lower portion subcoriaceous, broad upper portion herbaceous, $4\frac{1}{3}$ in. long, the inner longer than the outer. Corolla almost salver-shaped, under 1 in. long, apparently a pale rose colour, glabrous; lobes subacute.—Hallier f. in Engl. Jahrb. xxviii. 45.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shupanga, *Scott!* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1086! Nyasaland; River Shire, *Kirk!* Lake Nyasa, *Simons!*

78. **I. lapathifolia,** *Hallier f. in Engl. Jahrb.* xviii. 142. Perennial. Stems slender, twining, glabrous. Leaves ovate or lanceolate, 2–4 in. long, obscurely pubescent on both surfaces, cuneate at the base. Flowers few to many in a close umbellate cyme; peduncle $1\frac{1}{2}$–3 in. long; pedicels at most 6 lin. long; bracteoles minute, persistent, ovate or lanceolate. Calyx glabrous, 3 lin. long; sepals oblong, blunt. Corolla white, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, subcylindric in the lower half; expanded limb 1 in. in diam. Capsule globose, glabrous, 3 lin. in diam. Seeds glabrous, pale brown, $1\frac{1}{2}$ lin. long.—*I. zambesiaca*, Baker in Kew Bulletin, 1894, 70, not of Britten. *I. hellebarda*, var. *lapathifolia*, Hallier f. in Engl. Jahrb. xxviii. 44.

Mozamb. Dist. German East Africa: Ugogo, Muhalala, *Stuhlmann*, 405. Portuguese East Africa: Quilimane, *Stuhlmann*, 109. Lower Zambesi: Shupanga, *Kirk! Waller!* Zambesi Delta, *Kirk! Scott!*

The identification of *I. zambesiaca* with *I. lapathifolia* rests on Hallier's authority. We have not seen the specimens collected by Stuhlmann on which *I. lapathifolia* was based. I am unable to follow Hallier in his later reduction of the species to a variety of *I. hellebarda*, which seems amply distinguished by its larger white corolla and velvety seeds.—*A. B. R.*

79. **I. humifera,** *Rendle & Britten in Journ. Bot.* 1894, 177. Perennial. Main stem trailing, slender, hairy; branches long, very slender, glabrous, ultimately climbing. Leaves cordate-ovate, acuminate, membranous, rigid, glabrous, except on the edge and petiole, those of the shoots 2–$2\frac{1}{2}$ in. long. Flowers solitary; peduncle glabrous, shorter than the leaves; bracteoles minute, subulate. Sepals subequal, ovate, glabrous, 3 lin. long. Corolla between tubular and funnel-shaped, bright purple, $1\frac{1}{2}$–2 in. long.—Hiern in Cat. Afr. Pl. Welw. i. 737. *I. Barteri*, var. *cordifolia*, Hallier f. in Bull. Herb. Boiss. vi. 543.

Lower Guinea. Angola: Pungo Andongo: Mata de Pungo, *Welwitsch*, 6177! Quibinda, *Welwitsch*, 6178!

80. **I. Barteri,** *Baker in Kew Bulletin*, 1894, 70. Annual. Stems very slender, twining, clothed with fine spreading hairs. Leaves linear or lanceolate, ovate (*Hallier*), entire, membranous, 2–2½ in. long, 3–6 lin. broad at the middle, acute, narrowed gradually to the base; petiole very short, hairy. Peduncle barely 10 lin. long, 1-flowered; bracteoles small, subulate. Calyx sparsely hairy to glabrescent, verruculose, 4 lin. long; sepals ovate, obtuse. Corolla funnel-shaped, 2 in. long, glabrous outside; tube and throat purple. Capsule and seeds not seen.—Hallier f. in Bull. Herb. Boiss. vi. 542.

Upper Guinea. Banana Island, *Afzelius.* Northern Nigeria: Nupe; Jeba, *Barter!*

Var. *subsericea,* Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 96. Stem and peduncles densely clothed with yellowish hairs. Leaves densely silky above, hairy on the ribs beneath. Calyx 2 lin. long; outer sepals densely verrucose. Corolla 1¾ in. long.

Lower Guinea. Lower Congo, *Cabra,* 28. Mount Leopold, Stanley Pool, *Luja.*

Var. *stenophylla,* Hallier f. in Bull. Herb. Boiss. vi. 543. Leaves elongated, narrowly linear to linear-lanceolate, narrowed at base and apex, 2½–3½ in. long, 2–4 lin. broad, more or less hairy to glabrescent on both surfaces. Calyx glabrous to strongly verrucose, 2½–3½ lin. long. Corolla 1½–2 in. long. Capsule globose, glabrous. Seeds naked.—*I. Hanningtoni,* Baker in Kew Bulletin, 1894, 70. *I. Klotzschii,* Dammer in Engl. Pfl. Ost-Afr. C. 332.

Nile Land. British East Africa: between Mombassa and Lamu, *Whyte!*

Mozamb. Dist. German East Africa: Usambara, Duga, *Holst,* 3195! and without precise locality, *Hannington!* Portuguese East Africa: by the Zambesi, *Peters,* 8. British Central Africa: Tanganyika Plateau, *Carson!*

81. **I. fastigiata,** *Sweet, Hort. Brit. ed.* 1, 288. Stem slender, climbing, subwoody, hollow, glabrescent. Leaves long-petioled, cordate-ovate, 3 in. long, 1¾–2½ in. broad, acuminate, glabrous on both surfaces; petiole slender, shorter than the blade. Flowers several in a corymbose cyme; peduncle 2–4 in. long; pedicels about 6 lin. long. Sepals ovate, thinly coriaceous, glabrous, elliptic, obtuse, mucronate, about 4 lin. long, the outer narrower and slightly shorter. Corolla campanulate, funnel-shaped, rose-purple, glabrous, 1½–2 in. long. Stamens unequal.—Choisy in DC. Prodr. ix. 380. *I. tiliacea,* Choisy, l.c. ix. 375; Hallier f. in Bull. Herb. Boiss. vii. 49. *I. hirsuticaulis,* C. H. Wright in Kew Bulletin, 1896, 162.

Upper Guinea. Cameroons; Batanga, *Bates,* 341!

A widespread Tropical American species.

82. **I. nuda,** *Baker in Kew Bulletin,* 1894, 72, *not of Peter.* Perennial, glabrous. Stem woody, rugulose, twining. Leaves entire, cordate-ovate, acute, apiculate, 3–4 in. long, green and glabrous on both surfaces; petiole 1½–2 in. long. Peduncle stout, nearly 3 in. long; cymes rather densely many-flowered; pedicels 3–4 lin. long; bracts ovate, minute. Calyx glabrous, barely 6 lin. long; sepals coriaceous, glabrous, ovate, obtuse to subacute, obscurely mucronate. Corolla funnel-shaped, 2 in. long, violet-purple. Fruit and seeds not seen.

Hiern in Cat. Afr. Pl. Welw. i. 741; Hallier f. in Engl. Jahrb. xxviii. 45.

Lower Guinea. Angola: Pungo Andongo; near Catete, *Welwitsch*, 6230! Malange, *Mechow*, 565b.

83. **I. hellebarda,** *Schweinf. Pl. Gallab. Exsicc.* 2176. Perennial, from a cylindrical soft-woody tuberous root, generally glabrous. Stems slender, herbaceous, twining, glabrous or with soft spreading hairs. Leaves entire, ovate to sagittate or hastate, 2–3 in. long, varying from $2\frac{1}{2}$–$2\frac{1}{3}$ in. in breadth, with basal lobes also very variable in length and breadth, generally acuminate, minutely apiculate, green and glabrous on both surfaces, margin generally obscurely ciliolate; petiole shorter than the blade. Peduncle stout, glabrous, $1\frac{1}{2}$–3 in. long, bearing a few-flowered cyme. Bracts small, lanceolate to ovate, acute; pedicels glabrous, less than 6 lin. long. Calyx glabrous, 3–4 lin. long; sepals coriaceous with thinner margins, elliptic to ovate, obtuse, often mucronulate. Corolla funnel-shaped, bright red-purple, about 2 in. long; limb $1\frac{1}{2}$–2 in. in diam. Capsule globose, glabrous, $\frac{1}{3}$ in. in diam. Seeds 4, pale brown, velvety.—Hallier f. in Engl. Jahrb. xviii. 142 in syn., and xxviii. 43; Hiern in Cat. Afr. Pl. Welw. i. 737 incl. var. *sarcopoda*. *I. sagittata*, Benth. in Hook. Niger Fl. 467; A. Rich. Tent. Fl. Abyss. ii. 69 excl. syn.; Hallier f. in Engl. Jahrb. xviii. 142, and in Bull. Soc. Roy. Bot. Belg. xxxvii. 97, not of Poiret; var. *diversifolia*, Choisy in DC. Prodr. ix. 372. *I. sagittifolia*, Ker in Bot. Reg. t. 437. *Convolvulus diversifolius*, Schumach. & Thonn. Beskr. Guin. Pl. 94, and in K. Dansk. Vid. Selsk, Afhandl. iii. 114. *Batatas abyssinica*, A. Rich. l.c. ii. 64.

Upper Guinea. Senegal, *Roger! Leprieur.* Gambia, *Ingram!* Guinea, *Vahl, Thonning.* Gold Coast: Accra, *Krause*, 78; *Buchner*, 2746. Togo: between Bismarckburg and Misahöhe, *Büttner*, 750.

Nile Land. Eritrea: Keren, *Steudner*, 943. Gallabat: around Matamma, *Schweinfurth*, 2176. Abyssinia: Hamedo, *Schimper*, 263, 361; Taccazze Valley and Shireh, *Quartin-Dillon.* Niamniam: Nabambisso River, *Schweinfurth*, 3755.

Lower Guinea. Angola: Ambriz, *Monteiro!* Loanda; Quicuxe and Imbondeiro dos Lobos, *Welwitsch*, 6239! Penedo, *Gossweiler*, 1482!

84. **I. shupangensis,** *Baker in Kew Bulletin*, 1894, 73. Perennial, glabrous. Stems climbing, woody with a much-wrinkled surface. Leaves entire, cordate-ovate, acute, membranous, glabrous, 3–4 in. long and broad; petiole slender, 2–3 in. long. Flowers many in a lax compound cyme on a peduncle $2\frac{1}{2}$–3 in. long; pedicels $\frac{1}{2}$–1 in. long; bracts minute. Calyx glabrous, 6 lin. long; sepals ovate, obtuse, mucronulate, much imbricate. Corolla funnel-shaped, white, $2\frac{1}{2}$–3 in. long. Fruit and seeds not seen.—*I. schupangensis*, Hallier f. in Engl. Jahrb. xxviii. 45.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shupango, *Kirk*, 229! 230!

85. **I. aquatica,** *Forsk. Fl. Ægypt.-Arab.* 44. Annual, glabrous. Stems numerous from a stout woody base, trailing on mud or floating on water, stout, hollow, rooting from the nodes, rarely bearing short, soft, spreading hairs. Leaves very variable in shape, usually cordate-ovate,

subacute, 3–6 in. long, sometimes narrower, sometimes hastate, or in the narrower leaves having a rounded or subtruncate base; petiole as long as or shorter than the blade. Peduncle generally short, sometimes 1–2 in. long, 1- to few-flowered. Bracts minute, ovate, acute; pedicel stout, generally longer than the peduncle (up to 2 in. long). Sepals ovate, obtuse, generally 4–5 lin. long, thinly coriaceous, with narrow membranous edges, sometimes sparsely verruculose. Corolla funnel-shaped, bright purple, 2–3 in. long; limb spreading, up to $2\frac{1}{2}$ in. in diam. Capsule globose, 4 lin. in diam. Seeds minutely silky.—Hiern in Cat. Afr. Pl. Welw. i. 738. *I. reptans*, Poir. Encycl. Suppl. iii. 460; Choisy in DC. Prodr. ix. 349; Oliver in Trans. Linn. Soc. xxix. 115; Engl. Hochgebirgsfl. Trop. Afr. 346; Hallier f. in Engl. Jahrb. xviii. 143. *I. Clappertoni*, R. Br. in Denh. & Clapp. Travels, App. 240; Choisy in DC. Prodr. ix. 349, excl. syn.; Britten in Journ. Bot. 1894, 169.

Upper Guinea. Senegal, *Roger*! *Perrottet*, 522! Interior of Western Lagos, *Rowland*! Northern Nigeria: River Niger (Quorra), *Baikie*! *Vogel*, 126! small lake near Matuna, between Mouzak and Kpika, *Oudney*!

Nile Land. Gallabat: around Matamma, *Schweinfurth*, 2141! Abyssinia: Zana Lake and marshes of the River Reb, *Schimper*, 1449! Sanka Berr, in the Reb Valley, *Schimper*, 1456! and without precise locality, *Schimper*, 1450! Sudan: Kirreh, between Berber and Khartoum, *Schweinfurth*, 480; near Khartoum, *Petherick*! Kordofan, *Kotschy*, 80! 172! *Pfund*, 502! *Cienkowski*, 374; *Steudner*, 944! White Nile: Wod Schellai, *Schweinfurth*, 923! Salati, *Broun*! Edge of Nile, *Speke & Grant*! *Petherick*! *Sabatier*. Bahr-el-Jebel, *Muriel*, 72! Jur: Jur Ghattas, *Schweinfurth*, 2589! Somaliland: Savati, near the River Sagan, *Riva*, 1523, 1570, 1603. British East Africa: Lake Rudolf, *Smith*! Lake Dumi, *Gregory*! Nyika country, near Mombassa, *Wakefield*!

Lower Guinea. Lower Congo: *Smith*! *Greshof*! *Dupuis*, *Wilwerth*; Boma, *Dewèvre*, 2. Angola: Barra do Dande, *Welwitsch*, 6187! Pungo Andongo; near Sansamanda, *Welwitsch*, 6186! and between Lombe and Quibinda, *Welwitsch*, 6171!

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; Luabo River, *Kirk*! British Central Africa: shores of Lake Nyasa, *Johnson*, 394! *Kirk*!

Also through Tropical Asia to North Australia.

Var. *heterophylla*, Rendle. Lower leaves very long, linear, up to 4 in. long by $1\frac{1}{2}$–4 lin. broad, base broadly cuneate, entire, the upper much broader, hastate, up to nearly 4 in. long, and more than 1 in. broad at the base.—*I. reptans*, var. *heterophylla*, Hallier f. in Bull. Herb. Boiss. vi. 543.

Lower Guinea. German South-west Africa: Amboland; wood between Ondonga and Uukambi, *Rautanen*, 184, 196.

86. **I. stolonifera,** *Gmel. Syst.* ii. 345. Perennial, from a stout tuberous root, glabrous. Stems trailing widely on the sands of the seashore or running just beneath the surface and sending up short erect leafy branches. Leaves very variable in shape, thick, rather fleshy, usually linear or oblong, 2–4 in. long, entire, apex rounded, mucronulate, sometimes emarginate, base cuneate, sometimes slightly cordate or auricled to hastate; petiole 1–$1\frac{1}{2}$ in. long or less. Peduncles 1–3-flowered, from less than 1–3 in. long; bracts minute, subulate; pedicel generally stouter than the peduncle, 1–$1\frac{1}{2}$ in. long. Sepals thinly coriaceous, 4–5 lin. long, oblong to ovate, obtuse

or minutely cuspidate. Corolla funnel-shaped, 1½–2 in. long, white with a purple eye. Capsule globose, glabrous, 6 lin. in diam. Seeds shaggily tomentose.—Hiern in Cat. Afr. Pl. Welw. i. 738. *I. carnosa*, R. Br. Prodr. 485. *I. acetosæfolia*, Roem. & Schultes, Syst. iv. 246. *I. humilis*, G. Don, Gen. Syst. iv. 267; Choisy in DC. Prodr. ix. 390. *I. incurva*, G. Don, l.c. 266. *I. littoralis*. Boiss. Fl. Or. iv. 112; Hallier f. in Engl. Jahrb. xviii. 144 and in Bull. Herb. Boiss. v. 376. *Batatas acetosæfolia* and *B. littoralis*, Choisy in DC. Prodr. ix. 337–8. *B. incurva*, Benth. in Hook. Niger Fl. 464. *Convolvulus littoralis*, Linn. Syst. Nat. ed. 10, ii. 924. *C. incurvus*, Schumach. & Thonn. Beskr. Guin. Pl. 99.

Upper Guinea. Senegambia: *Perrottet*, 519 partly! Sierra Leone: *Don! Morson! Smeathman! Scott-Elliot*, 4109! Gold Coast, *Krause*, Cape Coast Castle, *Brass!* Togo: near Lome, *Warnecke*, 56! Lagos, *Moloney!* Southern Nigeria: Nun River, *Vogel*, 35! Fernando Po and shore of the River Brass, *Barter*, 23! 1843! Cameroons: Batanga, *Dinklage*, 617.

Lower Guinea. St. Thomas Island, *Don! Moller.* Lower Congo: Banana, *Monteiro!* Loango, *Soyaux*, 13! Angola: Ambriz, *Welwitsch*, 6251! Libongo, *Welwitsch*, 6248! between Cape Palmiera and mouth of the River Cuanza, *Welwitsch*, 6250! and near Tanga, *Welwitsch*, 6249! Loanda, *Gossweiler*, 7!

Widely spread on sandy sea-shores in the warmer parts of the world,

87. **I. repens,** *Lam. Illustr.* i. 467; *Encycl.* vi. 18. Perennial, glabrous. Stems hollow, woody, trailing very widely and binding the sand. Leaves firm, cordate-orbicular, glabrous, 3–6 in. in diam., obtuse, emarginate; petiole 1–4 in. long. Peduncles 1–4 in. long; cymes few- or many-flowered; pedicels ½–1½ in. long; bracts ovate, minute. Calyx 6 lin. long; sepals elliptic, apex rounded, minutely mucronate; two outer much shorter than the inner. Corolla funnel-shaped, bright red, 2–3 in. long; limb 2 in. in diam. Capsule globose, glabrous, 6 lin. in diam. Seeds glabrous, as large as a pea.—*I. asarifolia*, Roem. & Schultes, Syst. Veg. iv. 251; Benth. in Hook. Niger Fl. 466; Kotschy & Peyr. Pl. Tinn. 23, t. 10; Oliver in Trans. Linn. Soc. xxix. 115; Hallier f. in Engl. Jahrb. xviii. 145; Hiern in Cat. Afr. Pl. Welw. i. 738. *I. Beladamboe*, Roem. & Schultes, l.c. 233; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 209. *I. rugosa*, Choisy in DC. Prodr. ix. 350. *I. urbica*, Choisy, l.c. 349. *I. Vogelii*, Baker in Kew Bulletin, 1894, 71. *Convolvulus asarifolius*, Desrouss. in Lam. Encycl. iii. 562.

Upper Guinea. Senegal: *Schotte! Brunner! Heudelot*, 218! *Roger!* Interior of Western Lagos, *Rowland!* Northern Nigeria: Nupe, *Barter*, 841! Kuka, on Lake Chad, *Vogel!* Bornu, *Oudney!*

Nile Land. Sennar? *Kotschy*, 283! Darfur, *Purdy.* Jur, *Heuglin!* Banks of the Nile, *Speke & Grant! Schweinfurth*, 930! *Muriel*, 47!

Lower Guinea. Angola: Golungo Alto, River Delamboa, *Welwitsch*, 6202! 6148!

Also in the Cape Verde Islands, Tropical Asia, and Tropical America.

88. **I. biloba,** *Forsk. Fl. Ægypt.-Arab.* 44. Perennial, glabrous. Stems stout, woody, hollow, creeping widely on the sands of the seashore. Leaves suborbicular, firm, rarely elliptic to ovate, glabrous, 2–6 in. long, conspicuously emarginate at the apex, cuneate, truncate or some-

times cordate at the base; petiole generally shorter than the leaf. Peduncles exceeding the petioles, 2–5 in. long, bearing a lax few-flowered cyme; bracts minute, ovate-cuspidate; pedicels often an inch or more long. Sepals coriaceous, ovate or elliptic-ovate, obtuse, minutely cuspidate, glabrous, 4–5 lin. long, the outer generally shorter than the inner. Corolla broadly funnel-shaped, red-purple, 2 in. long. Capsule ovoid, glabrous, 9 lin. long, 4-valved. Seeds dark brown, villous, the size of a large pea.—Hiern in Cat. Afr. Pl. Welw. i. 739. *I. Pes-Capræ*, Roth, Nov. Sp. Pl. 109; Choisy in DC. Prodr. ix. 349; Franchet, Sert. Somal. 41; Hallier f. in Engl. Jahrb. xviii. 145, in Bull. Herb. Boiss. v. 376, and in Bull. Soc. Roy. Bot. Belg. xxxvii. 98 (var. *emarginata*); Dammer in Engl. Pfl. Ost-Afr. C. 332 (incl. forma *arenaria*). *Batatas maritima*, Boj. Hort. Maurit. 225. *Convolvulus rotundifolius*, Schumach. & Thonn. Beskr. Guin. Pl. 102.

Upper Guinea. Senegal, *Boivin! Roger!* Liberia, Cape Palmas, *Vogel*, 44! *Dinklage*, 70. Gold Coast, *Krause*. Lagos, *Millen!* Mouth of the Niger, *Barter!* Cameroons: Little Batanga, *Dinklage*, 346; Batanga, *Bates*, 153! Fernando Po, *Mann*, 241! *Vogel!*

Nile Land. British East Africa: Witu, *Thomas*, 200! Cape Guardafui, *Révoil*.

Lower Guinea. St. Thomas Island, *Moller*, *Quintas*, 60. Lower Congo: *Smith! Dewèvre*. Mouth of the Congo, *Naumann*. Banana, *Wilwerth*, *Monteiro!* Angola: Loanda, *Welwitsch*, 6240! Benguela, *Wawra*, 265. Mossamedes, *Welwitsch*, 6125!

South Central. Congo Free State: Mtowa, by Lake Tanganyika, *Descamps*.

Mozamb. Dist. Zanzibar, *Hildebrandt*, 1266! *Stuhlmann*, 102, 103, 104. German East Africa: Usambara; Muoa, *Holst*, 3040! Portuguese Africa: Zambesi Delta; Kongone River, *Kirk!* shore near Beira, *Mrs. Evelyn Cecil*, 242!

Also in South Africa, various African islands, and widely spread throughout the tropics.

89. **I. Protea,** *Rendle & Britten in Journ. Bot.* 1894,176. A shrub. Stems long, prostrate, branching, leafy, 5 ft. or more in length, surface rugulose and in the younger portion more or less minutely hirsute. Leaves generally broadly oblong to orbicular-oblong, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, about 1–$2\frac{1}{4}$ in. broad, apex rounded or very obtuse, mucronulate, base in the larger leaves incipiently cordate, upper surface scabridulous to sparsely pilose, lower surface lighter, markedly reticulate, minutely hirsute on the veins; petiole short, 6 lin. or less. Peduncles short (about as long as the petioles), sometimes single-flowered, generally bearing few- to many-flowered dichasial cymes; bracts minute, ovate; pedicels longer than the peduncles, stout, verruculose. Buds narrowly ovoid, pointed. Sepals glabrous, ovate, shortly acute, the two outer smaller, 5–6 lin. long, the inner 7–9 lin. long, verruculose on the back, margin especially of the inner ones pellucid. Corolla withered, apparently funnel-shaped, exceeding 1 in. Fruit unknown.—Hiern in Cat. Afr. Pl. Welw. i. 739.

Lower Guinea. Angola: Pungo Andongo, Quitage, *Welwitsch*, 6192!

90. **I. arenicola,** *Rendle & Britten in Journ. Bot.* 1894, 176. A glabrous perennial herb with a tuberous root. Stems decumbent, fleshy, purple, 4–10 in. long, Leaves deep green, $1\frac{1}{4}$–$3\frac{1}{2}$ in. long; lower lanceolate or elliptic, usually acute; upper larger, elliptic, subacute to acute; petiole about the length of the blade. Flowers on a many (–10) flowered spreading cyme springing from the base of the shoot, sometimes solitary or few together in axillary cymes; peduncles shorter than the leaves, $1\frac{1}{2}$ in. long or less; pedicels short; bracts small, triangular-subulate. Sepals narrowly ovate, acuminate, tip more or less convolute, 6 lin. long, the two outer smaller and shorter. Corolla apparently campanulate-funnel-shaped about 2 in. long, "whitish-violet, purple inside" (*Welwitsch*). Capsule globose, glabrous, 1 lin. in diam. Seeds shortly tomentose.—Hiern in Cat. Pl. Welw. i. 740.

Lower Guinea. Angola: Pungo Andongo; sandy woods near Cazella, *Welwitsch*, 6180!

91. **I. simplex,** var. **obtusisepala,** *Rendle.* Stem woody, apparently trailing, 6 in. long, reaching nearly 1 lin. in diam. at the base, glabrous. Leaves sessile, linear, narrowing towards the base, reaching $2\frac{1}{4}$ in. long and $1\frac{1}{2}$ lin. broad, glabrous, apex weakly cuspidate. Flowers solitary, axillary on very short peduncles. Sepals glabrous, ovate, subobtuse to shortly acute, 4 lin. long. Corolla rose-purple ?, funnel-shaped, $1\frac{1}{2}$ in. long.

Mozamb. Dist. Rhodesia: Salisbury, *Rand*, 272.

Described from a single shoot which I had formerly (*Journ. Bot.* 1901, 56) referred to the species, from which it differs in the shorter and almost obtuse sepals.

The species is widely distributed in South Africa.

92. **I. Welwitschii,** *Vatke ex Hallier f. in Engl. Jahrb.* xviii. 146. Near *I. simplex*, but much taller. Stems stiff, straight, woody, 9 in.–$1\frac{1}{2}$ ft. long, simple or shortly branched, terete, glabrous or minutely hirsute. Leaves linear to linear-lanceolate, shortly acute, tapering to a very short petiole, rigid, glabrous, $1\frac{3}{4}$–5 in. long, $1\frac{1}{2}$ to barely 3 lin. broad. Peduncles many, axillary, usually short, 1–3-flowered; bracts small, lanceolate. Sepals lanceolate, acuminate, glabrous, 5–7 lin. long. Corolla funnel-shaped, glabrous, white-rosy (*Welwitsch*), 2–$2\frac{1}{4}$ in. long, $1\frac{2}{3}$ in. broad.—Britten in Journ. Bot. 1894, 85; Rendle in Journ. Bot. 1901, 57; Hiern in Cat. Afr. Pl. Welw. i. 739. *I. Hystrix*, Hallier f. in Engl. Jahrb. xviii. 146, and in Bull. Herb. Boiss. vii. 53.

Lower Guinea. Angola: Malange, *Mechow*, 224; Huilla; bushy pastures between Nene and Mumpata and near Lopollo, *Welwitsch*, 6120! German South-west Africa: Damaraland, *Höpfner*, 39.

Mozamb. Dist. Lake Tanganyika, *Cameron!* German East Africa: Gonda (Igonda), *Boehm*, 56. British Central Africa: Nyasaland; Namitawa Mountain, *McClounie*, 85! Mlanji, *Scott-Elliot*, 8639! Shire Highlands, *Buchanan*, 134! North Nyasa, *Whyte!*

Var. *latifolia*, Britten in Journ. Bot. 1894, 85; Hiern in Cat. Afr. Pl. Welw. i. 739. Leaves linear-oblong to lanceolate or oblanceolate, cuspidate or shortly

acuminate, $1\frac{3}{4}$–3 in. long, 4–9 lin. broad.—*I. aspericaulis*, Baker in Kew Bulletin, 1894, 70.

Lower Guinea. Angola : Huilla, *Welwitsch*, 6120*b* !

93. **I. bolusiana,** *Schinz in Verh. Bot. Verein. Brandenb.* xxx. 271. Herbaceous, glabrous. Tuber about 2 in. in diam. Stem branching from the base; branches often prostrate and 2–3 yds. long. Leaves palmatisect; segments linear, rather fleshy, often with irregularly scabrid revolute edges, the central segment up to 4 in. long, segments less than 1 lin. to 2 lin. broad; petiole about 6 lin. long. Pedicels 1-flowered, 5–10 lin. long; bracteoles small, lanceolate. Sepals lanceolate, acuminate, glabrous, 6–8 lin. long. Corolla funnel-shaped, bright purple, above 3 in. long and above 2 in. in diam. Fruit and seeds unknown.—Hallier f. in Engl. Jahrb. xviii. 147, Bull. Herb. Boiss. vii. 53 with vars. *abbreviata* and *elongata*, and in Baum, Kunene-Samb. Exped. 347. *I. angustisecta*, Engl. Jahrb. x. 245, t. 7a; Baker & Wright in Dyer, Fl. Cap. iv. ii. 49, partly.

Lower Guinea. Angola: Mossamedes, *Newton*, 127. German South-west Africa : Amboland : Oshiheke and Olukonde, *Schinz*, 101 ! *Rautanen*, 176, 181 ; Hereroland : *Fleck*, 185*a*, 187*a*. Matungue River, 3500 ft., *Baum*, 299 ! Damaraland : *Een ! Hoepfner*, 94. Great Namaqualand : Rehoboth, *Fleck*, 45, 189*a*.

Mozamb. Dist. South Tropical Africa : *Baines !* Northern Kalahari Desert : near T'Klakane Pits, *Lugard*, 225 ! Botletle Valley, *Lugard*, 264. Matabeleland, *Elliott* !

Also in Madagascar and the Kalahari region of South Africa.

94. **I. Batatas,** *Lam. Encycl.* vi. 14. Perennial, with a large white or red, rarely yellow, tuberous root. Stems climbing, glabrous or slightly hairy. Leaves membranous, glabrous, 3–4 in. long, and broad, very variable in shape, 3-lobed to tripartite, central lobe large ovate, subacute, lateral lobes rounded to acute, sometimes again divided, the blade becoming more or less palmately pentapartite, rarely subentire, with coarsely dentate or angled margin; base flat ; petiole long. Peduncle long ; cymes dense ; pedicels short. Sepals subcoriaceous, oblong, shortly and abruptly acute, glabrous or with a few long soft hairs, 4–6 lin. long, two outer smaller than the three inner. Corolla reddish, campanulate-funnel-shaped, $1\frac{1}{2}$ in. long. Ovary 4-celled. Seeds glabrous. —Oliver in Trans. Linn. Soc. xxix. 115 ; Hallier f. in Engl. Jahrb. xviii. 138 and xxviii. 35 ; Hiern in Cat. Afr. Pl. Welw. i. 736 ; De Wild. & Durand in Bull. Herb. Boiss. 2 sér. i. 36. *Batatas edulis*, Choisy in DC. Prodr. ix. 338.

Upper Guinea. Senegambia, *Leprieur ; Perrottet*, 513.

Nile Land. Bahr-el-Jebel, *Muriel*, 91 ! Uganda : Kavirondo : between Nandi and Mumias, *Whyte !*

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 682 ; Boma, *Naumann*, 195 ; Stanleypool, *Hens*, B, 336 partly. Angola : Icolo e Bengo ; Prata, *Welwitsch*, 6220 ! Loanda, *Welwitsch*, 6219 ! Golungo Alto, *Welwitsch*, 6173 ! Mossamedes, *Welwitsch*, 6134 ! 6135 !

South Central. Congo Free State : Upoto, on the Congo, *Wilwerth* ; basin of Tanganyika, *Descamps.*

Mozamb. Dist. German East Africa : Usambara ; various localities, *Holst*,

Stuhlmann; Unyamwezi; Mininga, *Speke & Grant*, 173! between Lake Tanganyika and Lake Rukwa, 5000 ft., *Nutt!* Karema, on Lake Tanganyika, *Storms.* Portuguese East Africa: Mozambique, *Peters;* Zambesi Delta; Mazaro, *Kirk!* British Central Africa: Urungu: Fwambe, 5200 ft., *Nutt!* Nyasaland, *Webb!*

Var. *cannabina*, Hallier f. in Engl. Jahrb. xxviii. 37. Leaves palmatisect, with five linear obtuse mucronate lobes, mid lobe longer and broader than the rest, reaching 3 in. in length by 3–6 lin. in breadth.

Mozamb. Dist. Zanzibar, *Stuhlmann*, 99.

Widely cultivated in Tropical Africa, as it is in the other tropical and subtropical regions of both hemispheres. Its original native country is not clearly ascertained.

95. **I. leucantha,** *Webb in Hook. Niger Fl.* 152, *not of Jacq.* Stems slender, wide-climbing, glabrous. Leaves small, distinctly petioled. cordate-ovate, acute, sometimes shallowly palmately 3-lobed, glabrous. Cymes shortly peduncled, 2–3-flowered; bracts minute; pedicels as long as the calyx, thickened. Sepals ovate-oblong, shortly acute, glabrescent, 3 lin. long. Corolla white, openly funnel-shaped, 9 lin. long.—Hallier f. in Engl. Jahrb. xviii. 138.

Upper Guinea. Senegambia, *Heudelot*, 734!

Also in the Cape Verde Islands.

Doubtfully distinct from the Tropical American *I. triloba*, Linn.

96. **I. dissecta,** *Willd. Phytogr.* 5, *t.* 2, *fig.* 3; *Sp. Pl.* i. 880. Annual. Stems very slender, trailing, glabrous. Leaves digitate, glabrous, 1–1½ in. in diam., with five deeply pinnatifid to pinnatisect segments; petiole generally short, rarely nearly as long as the leaf. Peduncles shorter than the leaves, 1–3-flowered; pedicels short; bracts minute, lanceolate. Sepals thinly coriaceous, subequal, oblong to elliptic, minutely cuspidate, glabrous, often verruculose on the back, 2 lin. long. Corolla white, regularly funnel-shaped, 6 lin. long Capsule globose, glabrous, 3-celled, 3 lin. in diam. Seeds 6, dirty brown, thinly pubescent.—Choisy in DC. Prodr. ix. 363, excl. syn.; Hiern in Cat. Afr. Pl. Welw. i. 739. *I. coptica*, Roem. & Schultes, Syst. Veg. iv. 208 as to syn. Linn., &c., not of Roth; Choisy, l.c. 384; Hallier f. in Engl. Jahrb. xviii. 147, and xxviii. 45. *I. multisecta*, Welw. Apont. Phytogeogr. 589, no. 75. *Convolvulus copticus*, Linn. Mant. 559. *C. Thonningii*, Schumach. & Thonn. Beskr. Guin. Pl. 98.

Upper Guinea. Senegal, *Perrottet! Leprieur, Roger! Heudelot*, 270! Gold Coast: Accra, *Buchner*; Cape Coast Castle, *Brass! Brown*, 305! *Krause*, 77, *Isert*, 3746. Guinea, *Thonning.* Togo: near Lome, *Warnecke*, 284! Northern Nigeria: Bornu, *Vogel!*

Nile Land. Kordofan, *Figaré, Kotschy*, 58! 95! *Pfund*, 70! *Cienkowsky!* British East Africa: Marnessa, *Hildebrandt*, 2368; near Maji Chumvi, 500 ft., *Kässner*, 464!

Lower Guinea. Angola: Loanda, *Welwitsch*, 6253! *Gossweiler*, 784! Pungo Andongo; near Sansamanda, *Welwitsch*, 6170! German South-west Africa: Amboland; Olukonda, *Rautanen*, 1! Ondonga, *Rautanen*, 178.

Mozamb. Dist. Portuguese East Africa: Sena, *Kirk! Peters.* British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1074! Nyasaland; Shire Highlands, *Buchanan*, 1029! 1106! Ngamiland; Kwebe Hills, 3300 ft., *Mrs. Lugard*, 140!

Also in South Africa, Tropical Asia, and Australia.

Var. *malvæfolia*, Rendle. Leaves palmately 5-lobed: lobes short, serrate, median one larger than the lateral.—*I. coptica*, var. *malvæfolia*, Hallier f. in Engl. Jahrb. xviii. 147.

Nile Land. Kordofan, *Pfund.*

Var. *acuta*, Rendle. Stems prostrate or climbing; bracts larger, palmately laciniate like the leaves, enveloping the calyx.—*I. coptica*, Roth, Nov. Pl. Sp. 110; var. *acuta*, Choisy in DC. Prodr. ix. 384; Hallier f. in Engl. Jahrb. xxviii. 47. *I. palmatisecta*, Bojer ex Choisy. l.c. 352.

Nile Land. British East Africa: Rabai Hills, near Mombasa, *Taylor!* between Mombasa and Lamu, *Whyte!*

Mozamb. Dist. Zanzibar, *Bojer, Hildebrandt*, 992! *Blackburn! Kirk!* German East Africa: Usambara: Doda, *Holst*, 2976! Portuguese East Africa: Zambesi Delta; Chinde, *Webb!* Inhambane, *Peters.*

Also in India, Ceylon and China.

97. **I. pulchella,** *Roth, Nov. Pl. Sp.* 115, *not of Wight.* Glabrous; stem very slender, climbing, subterete. Leaves divided almost to the base of the blade into five segments, the two lower having a small lobe on the outer side; segments elliptic, $\frac{3}{4}$ to 1 in. or more in length, blunt, minutely apiculate; petioles slightly longer than the blade; a pair of small leaves of an axillary bud simulate stipules as in *I. palmata.* Flowers solitary, axillary; peduncles filiform, shorter than the petiole; bracteoles ovate, minute; pedicel shorter and much thicker than the peduncle, clavate. Sepals thinly coriaceous, orbicular, subequal, edges membranous, barely $1\frac{1}{2}$ lin. long. Corolla rose-purple, 6 lin. long; limb short, entire, spreading abruptly from a broad somewhat inflated tube. Capsule about 4 lin. in diam.; seeds pubescent with longer hairs on the edges.—Choisy in DC. Prodr. ix. 386; Hallier f. in Bull. Herb. Boiss. vii. 55, and in Engl. Jahrb. xxviii. 48, incl. var. *arachnosperma. I. palmata*, Kotschy in Herb. Un. Itin. 1841, No. 177, not of Forsk. *I. radicans*, Bert. ex Choisy in DC. Prodr. ix. 387; Hallier f. in Engl. Jahrb. xviii. 148.

Nile Land. Kordofan: Arashkol Mountain, *Kotschy*, 177!

Lower Guinea. Angola: on the River Coroca above Gargonto do Diabo, 1000 ft. alt., *Baum*, 11!

Mozamb. Dist. German East Africa: Ugogo, Muhalala, *Stuhlmann*, 396. British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1083!

Also in Tropical America.

98. **I. quinquefolia,** *Hochst. ex Hallier f. in Engl. Jahrb.* xviii. 147. Annual. Stems very short, trailing or ascending, glabrous, sometimes papillose. Leaves digitate, membranous, glabrous; leaflets 5, oblong-lanceolate, 1–$1\frac{1}{2}$ in. long, narrowed from the middle to the base and apex; petiole as long as or longer than the blade, sometimes muriculate. Flowers single, shortly peduncled; bracts minute, subulate. Sepals oblong-ovate, acute, glabrous, subequal, the two outer slightly shorter, $2\frac{1}{2}$ lin. long. Corolla broadly funnel-shaped, white, fugacious; shortly lobed, about 1 in. long. Capsule globose, glabrous, about 3 lin. in diam. Seeds dark brown, velvety.—Hallier f. in Bull

Herb. Boiss. vi. 545 (var. *albiflora*); Baker and Wright in Dyer, Fl. Cap. iv. ii. 66.

Nile Land. Abyssinia: *Schimper*, 321! Tacazze Valley, *Steudner*, 954. Somak Efat, *Roth* (87) 422!

Var. *purpurea*, Hallier f. in Bull. Herb. Boiss. vi. 546. A climber with elongated whip-like branches, several yards long, internodes very long, up to 8 in. Corolla bright purple.—Hallier f. in Jahrb. Hamburg. Wissensch. Anstalt, xv. 412; Baker & Wright in Dyer, Fl. Cap. iv. ii. 66.

Lower Guinea. German South-west Africa: Amboland: between Ondonga and Unkuambi, *Rautanen*, 177, 179, 192, 193. Otjimbingue, *Fischer*, 103, 106.

Mozamb. Dist. British Central Africa: Ngamiland; near Kaphei, *Fleck*, 186*a*; Kwebe Hills, 3300 ft., *Mrs. Lugard*, 218!

Also in South Africa.

99. **I. palmata,** *Forsk. Fl. Ægypt.-Arab.* 43. Perennial, glabrous. Stems slender, twining, smooth or tubercled or muricate. Leaves membranous, glabrous, 1–3 in. long and broad, cut nearly or quite to the base into generally five segments, the lowest of which are sometimes unequally bifid to bipartite; segments from narrowly oval to lanceolate, varying from 1 lin. to nearly 1 in. in breadth, obscurely mucronulate at the obtuse or subacute apex; petiole slender, as long as the blade, sometimes muriculate; base apparently stipulate from the presence of a pair of small similarly palmatipartite axillary leaflets. Peduncles generally shorter than the leaves, bearing lax few- to many-flowered cymes. Bracts minute, ovate; pedicels about 6 lin. long. Sepals coriaceous, ovate to orbicular-ovate, obtuse, 2–3 lin. long. Corolla funnel-shaped, bright red-purple, $1\frac{1}{2}$–2 in. long. Capsule globose, glabrous, 4–5 lin. in diam., 2-celled. Seeds 4, dark brown, shortly pubescent, angles bearded with long whitish hairs.—A. Rich. Tent. Fl. Abyss. ii. 72; Choisy in DC. Prodr. ix. 386; Benth. in Hook. Niger Fl. 468; Oliver in Trans. Linn. Soc. xxix. 115; Schweinf. Beitr. Fl. Aethiop. 95; Hiern in Cat. Afr. Pl. Welw. i. 740; Baker & Wright in Dyer, Fl. Cap. iv. ii. 66. *I. cairica*, Sweet, Hort. Brit. ed. i. 287; Hallier f. in Engl. Jahrb. xviii. 148. *I. senegalensis*, Lam. Ill. i. 464. *I. tuberculata*, Roem. & Schultes, Syst. iv. 208; Choisy, l.c. 386. *I. vesiculosa*, P. Beauv. Fl. Owar. ii. 73, t. 106; Choisy, l.c. 387. *I. Mendesii*, Welw. Apont. Phyto-geogr. 584, No. 12. *Batatas senegalensis*, G. Don, Gen. Syst. iv. 261. *Convolvulus cairicus*, Linn. Syst. ed. x. 922; Bot. Mag. t. 699; Schumach. & Thonn. Beskr. Guin. Pl. 96.

Upper Guinea. Senegambia, *Brunner!* Senegal, *Roger! Leprieur!* Gambia, *Ingram!* Sierra Leone, *Brass! Scott-Elliot*, 4082! *Don! Morson! Smeathman! Vogel*, 48! Liberia, *Whyte!* Cape Coast Castle, *Brass!* Lagos, *Millen! Rowland!* Cameroons: Batanga, *Bates*, 51! and without precise locality, *Preuss*, 767! 1105! Fernando Po, *Mann*, 54! *Vogel*, 40! 236!

Nile Land. White Nile, *Schweinfurth*, 1056! *Muriel*, 50! *Petherick! Speke & Grant!* Bahr-el-Jebel, *Muriel*, 69! Soudan: Kordofan, *Kotschy! Pfund*, 499! Khartoum, *Schweinfurth*, 777. Eritrea: Mount Idet, *Terracciano & Pappi*, 36. Abyssinia, *Schimper*, 1379! *Petit*; Shashago district, *Wellby!* Somaliland: banks of the River Karaule, *Riva*, 886, 987; and without precise locality, *Donaldson Smith!* Uganda: Berkeley Bay, *Scott-Elliot*, 7091! Lake-shore at Musozi,

Bagshawe, 15! British East Africa: Athi plains at Lanjoro, *Gregory! Pospichel;* between Mombasa and Lamu, *Whyte!*

Lower Guinea. Lower Congo: by the Congo, *Smith!* Stanley Pool, *Hens*, B, 82! Malela, *Dewèvre*, 159. Gaboon: Munda; Sibange Farm, *Soyaux*, 442! *Büttner*, 382. Princes Island, *Welwitsch*, 6208! St. Thomas Island, *Moller*, 64. Angola: Loanda: *Gossweiler*, 337! Icolo e Bengo, *Welwitsch*, 6205! Libongo; by the River Lefune, *Welwitsch*, 6206! Golungo Alto; near Sange, *Welwitsch*, 6207! Mossamedes; by the River Bero, *Welwitsch*, 6117! German South-west Africa: Damaraland, *Een!* Grootfontein, *Schinz*, 21!

South Central. Congo Free State: Nyangwe, *Dewèvre*, 1045. Coquilhatville, *Laurent;* Bolobo, *Büttner*, 383; Lualuba River, *Pogge*, 1233, 1243. Mtowa, *Descamps*.

Mozamb. Dist. German East Africa: Usambara, *Holst*, 566, 3127; Karagwe, *Stuhlmann*, 1732, 1747. Portuguese East Africa: Zambesi Delta, *Scott!* Rio de Sena, *Peters*. Lake Nyasa, *Johnson*, 353! British Central Africa: Nyasaland; Fort Hill and Monkey Bay, *Whyte!* Shire Valley, *Kirk! Buchanan!*

Also in Egypt, and South Africa, and widely spread in the tropics of both hemispheres.

Var. *indica*, Rendle. Branches slender filiform. Peduncle short, usually 1-flowered; flowers small; calyx $2\frac{1}{2}$ lin. long; corolla barely exceeding 1 in. long.—*I. cairica*, var. *indica*, Hallier f. in Ann. Istit. Bot. Roma, vii. 231.

Nile Land. Somaliland: between Gerlobrus and Hammar; and without precise locality, *Miss E. Cole*, in Berlin Herbarium.

100. **I. stellaris**, *Baker in Kew Bulletin*, 1894, 73. Perennial, glabrous. Stems trailing widely, with long internodes. Leaves orbicular in general outline, 2–3 in. long and broad, palmately cut to the base into 7 entire narrowly linear-lanceolate segments, $1\frac{1}{2}$–3 lin. broad at the middle, the central ones quite entire, the two outer usually forked. Peduncle 2–3 in. long; cyme dense, many-flowered; pedicels short. Sepals glabrous, ovate, shortly acute, 3 lin. long. Corolla funnel-shaped, bright red-purple, $1\frac{1}{2}$ in. long. Fruit and seeds not seen.

Mozamb. Dist. German East Africa: by the Rovuma River, *Kirk!*

101. **I. dasysperma,** *Jacq. Eclog.* i. 132, *t.* 89. An annual glabrous herb. Stems slender, climbing, 3 ft. or more in length. Leaves up to nearly 3 in. broad, doubly tripartite; ultimate segments linear-lanceolate, acute; petioles nearly as long as the blade. Peduncle shorter than the petiole, 1–3-flowered; bracts minute; pedicels thicker than the peduncle, clavate. Calyx 4 lin. long; sepals coriaceous, elliptic-ovate, obtuse, three outer broader, shorter, gibbous and tuberculate at the base. Corolla funnel-shaped, 2 in. long; tube cylindrical, violet; limb broadly spreading, bluntly 5-lobed, sulphur-yellow. Capsule globose, 2-celled; seeds 4, orange-coloured, covered with silky tomentum.—Choisy in DC. Prodr. ix. 386; Hallier f. in Engl. Jahrb. xviii. 148. *I. tuberculata*, Bot. Reg. t. 86. *Calonyction diversifolium*, var. *sulfureum*, E. Morr. in Belg. Hort. 1857, 225 with fig., and Fl. Serres, 2 sér. iii. 67, t. 1328. *C. trichospermum*, var. *diversifolium*, Choisy in DC. Prodr. ix. 346.

Nile Land. Nubia: Abdin, *Paul von Württemburg.* Abyssinia, *Schimper,* 2042.

In the *Flora Capensis*, iv. ii. 67, this specimen is regarded as a yellow-flowered variety of *I. palmata*, but it differs in the saccate calyx as well as in the colour of the flower. The South African specimen is probably not conspecific, the corolla is only $1\frac{1}{4}$ in. long, and apparently white; it seems also to be a smaller-leaved plant.

102. **I. calcarata,** *N. E. Br.* Stem twining $\frac{3}{4}$–1 lin. thick, sparsely covered with minute tubercles. Leaves glabrous, doubly tripartite, primary divisions stalked, secondary lanceolate, acute, tapering at the base, median segment $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, the others gradually smaller; petiole $\frac{3}{4}$–$1\frac{1}{2}$ in. long; pseudostipulate by the development of a pair of axillary palmatisect leaves. Peduncles $\frac{3}{4}$–1 in. long, 1-flowered, glabrous, bearing at the middle a pair of subulate bracteoles $\frac{3}{4}$ lin. long. Sepals elliptic-oblong, very obtuse, glabrous, 5 lin. long and half as broad, two of the outer sagittately bicalcarate at the base, the third with one spur and the two inner without spurs. Corolla funnel-shaped, glabrous, $1\frac{3}{4}$–2 in. long, with limb of equal diameter, light yellow or delicate saffron-coloured marked with light violet in the throat of the tube. "Flower opens with sunrise and rapidly closes." Fruit unknown.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe, *Lugard,* 182! Kwebe Hills, 3300 ft., *Mrs. Lugard,* 208!

Evidently very closely allied to, perhaps inseparable from, *I. dasysperma,* Jacq., which we know only from the figure. Jacquin, however, does not show the quasi-stipular development which gives a characteristic appearance to the leaves. The corolla-tube is slightly longer, and the calyx more markedly gibbous in the plants which Mr. Brown has described.—*A. B. R.*

103. **I. saccata,** *Hallier f. in Engl. Jahrb.* xxviii. 48. A perennial herb. Stems twining, glabrous, terete, rubescent, rough with raised points, as are the peduncles and pedicels. Leaves about $2\frac{3}{4}$ in. long by $3\frac{1}{2}$ in. broad, biternately pedate, with lanceolate acute mucronate lobes; petiole $1\frac{1}{2}$ in. long, thin, sparsely muriculate. Peduncles axillary, robust, longer than the petiole, up to $2\frac{3}{4}$ in.; flowers many, corymbose; pedicels $\frac{1}{3}$–1 in. long. Calyx 5 lin. long. Sepals subcoriaceous, brownish with a pale membranous edge, roundish-elliptic, obtuse, the two outer gibbous and fimbriate on both sides at the base, sometimes almost spurred. Corolla showy, $2\frac{1}{2}$ in. long, tubular-campanulate; limbs wide spreading, violet in the lower part, yellow in the upper. Capsule glabrous, globose, about 5 lin. in diam. Seeds trigonous, velvety and with long yellowish hairs on the angles.

Mozamb. Dist. German East Africa: Usagara; Tubugue, *Stuhlmann,* 210.

104. **I. odontosepala,** *Baker in Kew Bulletin,* 1894, 73. Habit apparently of *I. palmata.* Leaves thin, glabrous, orbicular in general outline, $1\frac{1}{2}$–2 in. in diam., deeply divided into 5 lanceolate to oblanceolate, acute segments, the outer pair forked; petiole very slender, about as long as the blade. Calyx glabrous, 4 lin. long; sepals coriaceous,

3–5 lin. long, unequal, ovate, obtuse, the outer shorter, and toothed at the base. Corolla funnel-shaped, white, glabrous outside, 4 in. long, limb nearly as broad; lowest third of the tube subcylindrical. Fruit and seeds not seen. —? *I. pentaphylla*, Cav. Ic. and Descript. iii. 29, t. 256, not of Jacq.; Choisy in DC. Prodr. ix. 385; Capua in Ann. Istit. Bot. Roma, viii. 225.

Nile Land. Eritrea: Assaorta, *Pappi*, 2973.

Mozamb Dist. German East Africa: without precise locality, *Hannington!*

The reference of an incomplete specimen to *I. pentaphylla* by Capua, l.c. is doubtful.

105. **I. prismatosyphon,** *Welw. Apont. Phyto-geogr.* 585. An erect undershrub, 4–6 ft. high, containing a milky juice. Stems many, stout, woody, cinereo-pubescent, densely leaved. Leaves oblong, base and apex rounded, the latter shortly apiculate, up to 3 in. long by $1\frac{1}{2}$ in. broad, margin undulate, upper surface puberulous, lower covered with a dense light tawny tomentum, penninerved, bearing a gland on each side just above the petiole; petiole 6 lin. long. Flowers very fine, solitary, peduncle $\frac{1}{2}$–$2\frac{1}{4}$ in. long, pubescent like the stem, bearing a pair of large broadly obovate foliaceous bracts (about 1 in. long), exceeding the short pedicel ($\frac{1}{4}$ in.) and calyx, but soon falling. Sepals elliptic, very blunt, densely covered on the back with the light tawny tomentum, barely 1 in. long by about $\frac{1}{2}$ in. broad. Corolla whitish rosy, 5 in. long; tube broad cylindrical, about $\frac{2}{3}$ in. in diam., expanding above into a funnel-shaped lobed limb, about 3 in. in diam.; mid-petaline areas limited by a hairy nerve in the young flower, subsequently glabrous. Capsule woody, pubescent; valves 4, elliptic, a little over 1 in. long; seeds brown, $4\frac{1}{2}$ lin. long, enveloped in a dense tuft of long shiny pale tawny hairs.—Britten in Journ. Bot. 1894, 84; Hiern in Cat. Afr. Pl. i. 741. *I. Buchneri*, var. *tomentosa*, Hallier f. in Engl. Jahrb. xviii. 152.

Lower Guinea. Angola: in the Præsidium of Pungo Andongo, *Welwitsch*, 6182!

Var. *Buchneri* (sphalm. *Buchingeri*), Britten in Journ. Bot. 1894, 85. Whole plant glabrous except on the lateral nerves on the under surface of the leaf, which are described as canescent. —*I. Buchneri*, Peter in Engl. and Prantl, Pflanzenfam. iv. 3 A., 29; Hallier f. in Engl. Jahrb. xviii. 151, and in Bull. Soc. Bot. Belg. xxxvii. 100.

Lower Guinea. Angola: Malange, *Buchner*, 135, *Mechow*, 439; Loanda, Matto de Mbango, *Gossweiler*, 1111!

106. **I. magnifica,** *Hallier f. in Engl. Jahrb.* xviii. 152. Stem very similar to *I. prismatosyphon*, in habit and flower, grey-pubescent. Leaves distinctly and minutely petioled, ovate-suborbicular, nearly 5 in. long, over 3 in. broad, base subacute, apex shortly acuminate, undulate on the margin, glabrous above, grey-pubescent beneath. Flowers solitary, axillary; bracts and sepals grey-pubescent on the outside, white-tomentose on the edge. Corolla 5 in. long; limb nearly as broad; tube above 6 lin. in diam.—*I. Buchneri*, var. *latifolia*, Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 100.

Nile Land. Niamniam: Gumba, *Schweinfurth*, 3994.

107. **I. macrocalyx,** *Hallier f. in. Engl. Jahrb.* xxviii. 51, *not of Choisy.* Stem densely clothed with short fine white pubescence. Leaf cordate-ovate, entire, apiculate, 7–8 in. long, $4\frac{3}{4}$ in. broad, densely clothed with short whitish soft pubescence. Flowers solitary; peduncle strong, 9 lin. long. Calyx globose, $1\frac{1}{2}$ in. long, densely clothed with short soft whitish pubescence; two outer sepals orbicular, quite hiding the others. Corolla $4\frac{1}{4}$ in. long; tube silky; limb with 5 silky ribs outside. Stamens and style half as long as the corolla. Fruit and seeds unknown.—*Argyreia? macrocalyx*, Baker in Kew Bulletin, 1894, 67.

Mozamb. Dist. German East Africa: Unyamwezi, Msalala, *Hannington!*

108. **I. Hanningtoni,** *Rendle.* Leaves elliptic with retuse base, apiculate, $2\frac{3}{4}$ in. long by $2\frac{1}{4}$ in. broad, densely clothed with soft whitish pubescence as in *I. macrocalyx.* Calyx glabrous, barely 1 in. long; two outer sepals ovate, blunt, hiding the three inner. Corolla $4\frac{1}{2}$ in. long; tube and midpetaline areas on limb silky. Stamens and style half as long as the corolla. Fruit and seeds unknown.—*I. macrocalyx*, var. *decalvata*, Hallier f. in Engl. Jahrb. xxviii. 51. *Argyreia Hanningtoni*, Baker in Kew Bulletin, 1894, 67.

Mozamb. Dist. German East Africa; Usambara; Kisokwe, *Hannington!*

Near *I. macrocalyx*, but distinguished by the shape of the leaf, and the shorter and glabrous calyx.

109. **I. dammeriana,** *De Wild. Études, Fl. Katanga*, 115. Erect; stems rigid, rather thick, glabrous. Leaves lanceolate, $3\frac{1}{2}$ to $4\frac{1}{2}$ in. long, 1–$1\frac{1}{4}$ in. broad, strongly cuneiform at the base, rather sharply apiculate at the apex, margin entire or undulate, glabrous on both surfaces, sometimes sparsely hairy on the nerves; petiole $\frac{1}{2}$ in. long. Flowers solitary on stalks less than $\frac{1}{2}$ in. long, bearing towards the middle a pair of large glabrous elliptic caducous bracts, nearly 1 in. long by half as broad, enveloping the young bud. Sepals about 1 in. long, coriaceous, elliptic, glabrous, apex obtuse or apiculate. Corolla tubular-campanulate, 4 in. long; tube $\frac{2}{3}$ in. in diam. Ovary glabrous.

South Central. Congo Free State: Katanga; Lukafu, *Verdick*, 252.

Recalls *I. prismatosyphon*, var. *Buchneri*, but differs in its narrower leaves with cuneiform base, and smaller flowers and bracts.

110. **I. macrosiphon,** *Hallier f. in Engl. Jahrb.* xxx. 387. A large subscandent shrub; stems woody, terete, glabrous, the leaves and flowers borne on short slender erect shoots springing from stouter elongated stems from which the leaves have fallen. Leaves broadly ovate, up to $4\frac{1}{2}$ in. long by $3\frac{1}{4}$ in. broad, cuspidate, subtruncate or slightly cordate at the base, margin slightly repand, dentate, glabrous when mature, covered with white wool on the veins beneath when young; petiole as long as the blade. Peduncles up to 1 in. long, 1-flowered; bracts opposite, large, membranous, cymbiform, enclosing

the bud, deciduous; pedicel shorter than the peduncle and, like it, glabrous. Sepals subequal, coriaceous, oblong, obtuse or emarginate, nearly 1 in. long and about ½ in. broad, bearing a minute greyish pubescence on the outside. Corolla white, narrowly funnel-shaped, from a long broad cylindrical tube, 4½–5 in. long; midpetaline areas bearing short white tomentum when young.

Mozamb. Dist. German East Africa: Uhehe; Iringa, 5000 ft., *Goetze*, 655.

111. **I. verbascoidea,** *Choisy in DC. Prodr.* ix. 356. An erect shrub, 3–5 ft. high. Stems stout, woody, terete, clothed like the leaves and peduncles with fulvous or whitish woolly tomentum. Leaves cordate-oblong, subacute or blunt with a short apiculus, entire or slightly sinuate, 3–6 in. long, 2–5 in. broad, densely white- or fulvous-tomentose beneath, especially on the raised veins, and bearing a gland on each side at the junction of blade and petiole; petiole stout, 1–4 in. long. Peduncle generally 3-flowered (flowers rarely solitary), tomentose, shorter than the petiole (1 in. or less in length); pedicels short; bracts linear-oblong to linear-oblanceolate, 7–10 lin. long, two lowest the largest, tomentose on the back like the sepals. Sepals chartaceous, elliptic, very obtuse, tomentose, equal, nearly ½ in. long. Corolla funnel-shaped, rose-purple, glabrous, 3–4 in. long; tube broad (½ in. in diam.); limb about 2½ in. in diam. Capsule globose, glabrous, ½ in. in diam.; seeds brown, ¼ in. long, densely covered with a fulvous wool.—Hallier f. in Engl. Jahrb. xviii. 151, and in Bull. Soc. Bot. Belg. xxxvii. 100 (excl. syn. *I. dammarana*); Hiern in Cat. Afr. Pl. Welw. i. 741. *I. Elliottii*, Baker in Kew Bulletin, 1894, 69.

Nile Land. Bongo: Maschir Hills, *Schweinfurth*, 4013! Jur: Jur Ghattas, *Schweinfurth*, 2044!

Lower Guinea. Angola: Huilla; Terrão da Sola, *Welwitsch*, 6111! 6114! between Mumpulla and Nene, *Welwitsch*, 6115. German South-west Africa: Hereroland; Otjimbingue, *Fischer*, 102.

Mozamb. Dist. Matabeleland, *Elliott!*

112. **I. dammarana,** *Rendle in Journ. Bot.* 1896, 36. Stems erect or climbing, woody, covered like the leaves, flower-stalks, bracts, and sepals with white tomentum. Leaves suborbicular to ovate, 1½–4 in. long, about as broad, apex blunt, often apiculate, base rather shallowly cordate, thinly clothed above, more densely beneath, with white tomentum, veins somewhat conspicuously reticulated beneath, bearing a gland on each side of the insertion of blade with petiole; petiole ¾–1½ in. long. Peduncles short, about ½ in. long, axillary, 1-flowered; bracts linear-oblong to oblong, narrowing to the base, about ½ in. long, reaching half way up the calyx. Calyx ½ in. long, white-tomentose; sepals chartaceous, elliptic, very obtuse. Corolla purplish, broadly funnel-shaped, glabrous, 3 in. long. Stamens and style reaching half way up the corolla; filaments dilated and pilose at the base. Fruit unknown.

Lower Guinea. Damaraland, *Een!*

Mozamb. Dist. Rhodesia; Buluwayo, *Rand*, 273!

"A handsome plant. Climbs over trees of 20 ft. or so in height."—R. F. Rand. Perhaps not distinct from *I. verbascoidea*, Choisy.

113. **I. Bakeri,** *Britten in Journ. Bot.* 1894, 85. An erect undershrub; branchlets slender, terete, woody, clothed with white pubescence. Leaves distinctly petioled, elliptic-oblong, with undulate margin, broadly rounded or subtruncate at the base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, moderately firm, green and glabrous above, coated beneath with persistent short white tomentum. Flowers solitary on very short peduncles. Calyx softly tomentose, $\frac{1}{2}$ in. long; sepals elliptic, obtuse, much imbricated. Corolla pallid, nearly 3 in. long, glabrous outside; lobes very small.—*I. discolor*, Baker in Kew Bulletin, 1894, 69, not of G. Don.

Mozamb. Dist. British Central Africa: Urungu; Abercorn, *Carson*, 18!

114. **I. lukafuensis,** *De Wild. Études Fl. Katanga*, 113, *t.* 2, *figs.* 1–10. A climber; stem subterete, hairy. Leaves broadly oval, obtuse, apex apiculate or emarginate, base more or less cordate, $2\frac{1}{2}$ to nearly $3\frac{1}{2}$ in. long, and $2\frac{1}{2}$ in. broad, clothed with short hairs on the upper surface, white tomentose on the lower, on which the nervation is rather prominent; petiole $1\frac{1}{2}$–$2\frac{1}{4}$ in. long, shortly hairy like the peduncle. Peduncle shorter than the leaf, few- (up to 3-) flowered, bearing at the summit two large opposite bracts, which completely surround the flower-bud in the young state; bracts at the base of the pedicels obovate, obtuse, 1 in. long, tomentose on the outside, upper bracts about 7 lin. long and half as broad, resembling the lower in shape and indumentum; pedicels hairy when young, up to about $\frac{1}{3}$ in. long. Sepals subequal, coriaceous with scarious margin, about 5 lin. long and 4 broad, shortly pubescent on the back when young, rapidly becoming glabrous. Corolla narrowly funnel-shaped, $3\frac{1}{2}$ in. long, glabrous. Ovary glabrous, ovoid, 2-celled at the base, 4-celled at the summit.

South Central. Congo Free State: Katanga; Lukafu, *Verdick*, 342.

Apparently near *I. Gerrardi* and *I. Grantii*, but distinguished by the blunt leaves, and the large bracts, which completely envelop the buds when young.

115. **I. Wakefieldii,** *Baker in Kew Bulletin*, 1894, 73. Perennial. Stems slender, woody, finely pubescent. Leaves entire, broadly elliptic with subcordate base to subovately orbicular with a more pronounced base, finally 5–6 in. long; throat cuspidate or emarginate, at first reticulate beneath with lines of whitish tomentum on the main veins and cross veinlets, finally green and finely pubescent all over; petiole $1\frac{1}{2}$–3 in. long. Peduncles short; flowers few in a lax racemose cyme; bracts obovate, $\frac{2}{3}$ in. long, deciduous. Calyx $\frac{1}{2}$ in. long, thinly covered with dull tawny tomentum; sepals subequal, broadly oblong, very obtuse, much imbricate. Corolla funnel-shaped, glabrous, $3\frac{1}{2}$ in. long. Fruit and seeds not seen.

Nile Land. British East Africa: Nyika country near Mombasa, *Wakefield!*

Very near the Cape *I. Gerrardi*, Hook. in Bot. Mag. t. 5651, and *I. alborenia*,

G. Don (*Convolvulus albovenius,* Lindl. in Bot. Reg. t. 1116), with which it is united by Hallier in Engl. Jahrb. xxviii. 51. It differs in its subequal sepals (in the South African species the inner are longer than the outer) and the broader tube of the darker coloured corolla ; also in the darker colour of the tomentum on the back of the leaf.

116. **I. Grantii,** *Oliver in Trans. Linn. Soc.* xxix. 116, *t.* 80. Perennial. Stems rather stout, angular, obscurely pubescent. Leaves ovate, slightly cordate, 3–4 in. long and broad, entire or shallowly lobed, base subtruncate, subcoriaceous, green, glabrous, and bullate above, matted with white pubescence beneath, both on the raised veins and cross-veinlets; petiole 2–3 in. long. Peduncles short; flowers several in a lax cyme; pedicels about $\frac{1}{2}$ in. long, thickening upwards, finely tomentose. Calyx $\frac{1}{2}$ in. long; sepals suborbicular, truncate at the apex, covered with fine white tomentum. Corolla funnel-shaped, bright red-purple, 3 in. long. Fruit and seeds not seen.—Hallier f. in Engl. Jahrb. xviii. 151, and xxviii. 51.

Nile Land. Uganda : Unyoro forests, *Speke & Grant*, 559!

Var. *palmati-pinnata,* Hallier f. in Engl. Jahrb. xxviii. 51. Leaves deeply palmati-pinnatifid, 7- to 9-lobed.—*I. Emini,* Hallier f. in Engl. Jahrb. xviii. 150 ; Dammer in Engl. Pfl. Ost-Afr. C. 332.

Nile Land. Uganda: Manyonyo, *Stuhlmann,* 1360; Mawakota, 3900 ft., *Brown*, 154!

Mozamb. Dist. German East Africa : Urambo, *Hannington!* Myombo; a day's march from Salanda, *Trotha*, 164; Gonda (Igonda), *Böhm*, 105a, 109a; Muansa, *Stuhlmann,* 4603; Simiu River, *Fischer,* 411.

117. **I. Buchanani,** *Baker in Kew Bulletin,* 1894, 73. Stems shrubby, wide-climbing, pubescent. Leaves ovate, entire, deeply cordate, minutely cuspidate, reaching a length and breadth of 5–6 in., finely pubescent above, densely pubescent beneath ; petiole 3–6 in. long. Cymes laxly few-flowered ; peduncle generally stout, up to 6 in. long, pubescent like the stem ; pedicel about $\frac{1}{2}$ in. long. Flower calyx 4–5 lin. long ; sepals orbicular, much imbricate. Corolla red, 3 in. long, shallowly lobed, funnel-shaped, with a broad tube widening to $\frac{3}{4}$ in. below the limb ; midpetaline areas well defined, glabrescent except at the pubescent apex.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan,* 319! 682!

118. **I. pringsheimiana,** *Rendle.* A climber with woody stem ; whole plant white-puberulous. Leaves exactly cordate, subobtuse, up to $4\frac{1}{2}$ in. long and as broad ; petiole up to $3\frac{1}{2}$ in. long. Peduncle robust, up to $3\frac{1}{2}$ in. long; cyme dichotomous, many-flowered ; bracts elliptic, blunt, shortly apiculate, barely $\frac{1}{2}$ in. long; pedicels short, white tomentose like the backs of the sepals. Sepals subequal, orbicular, 4–5 lin. long. Corolla funnel-shaped, with rapidly broadening tube and wide-spreading lobed limb, rose-coloured, 3 in. long and broad ; midpetaline areas becoming tomentose above the middle in the unopened corolla, otherwise glabrous. Stamens subequal ; filaments

dilated and densely hairy, $1\frac{1}{6}$ in. long at the base. Fruit and seeds not seen.—*Rivea pringsheimiana*, Dammer in Engl. Pfl. Ost-Afr. C. 334.

Mozamb. Dist. German East Africa: Usambara: Bulua, Gonja (Gonya) Mountain, 5000 ft., *Holst*, 4337!

119. **I. citrina,** *Hallier f. in Bull. Herb. Boiss.* vi. 547. An erect shrub. Young branches slender (scarcely 1 lin. thick), terete, clothed with grey tomentum, leafy and flowering above, the older stouter and glabrous, with an irregularly rugose cortex. Leaves cordate-orbicular, $1\frac{1}{2}$ in. long and nearly as broad, obtuse or subemarginate, mucronate, entire, clothed with yellowish silky hairs above and with whitish-grey tomentum beneath; petiole slender, terete, tomentose like the peduncle, 1–$1\frac{1}{2}$ in. long. Flowers in pairs on axillary peduncles, $1\frac{1}{4}$ in. long; bracts 2, large, persistent, white tomentose on the outside, broadly orbicular-spathulate, shortly clawed, $\frac{2}{3}$ in. long and broad, forming an involucre around the calyces, $\frac{2}{3}$ in. broad. Sepals resembling the bracts, broadly orbicular, tomentose, the outermost above $\frac{1}{2}$ in. long, the inner gradually smaller. Corolla pale yellow, nearly $1\frac{1}{2}$ in. long, broadly tubular funnel-shaped; midpetaline bands plainly limited, finely pilose on the outside. Stamens unequal, the two longer, like the style, half as long as the corolla. Ovary long, fusiform, glabrous.

Nile Land. Somaliland; Laku, *Keller*, 235.

120. **I. brasseuriana,** *De Wild. Études Fl. Katanga*, 115. Stem climbing, subcylindrical, greyish, densely clothed with spreading hairs. Leaves broadly oval or trilobed, $1\frac{3}{4}$ to $2\frac{1}{2}$ in. long, $1\frac{1}{2}$ to 2 in. broad, base cordate, densely hairy on both surfaces, covering denser and silvery on the lower surface; petiole about $\frac{1}{2}$ in. long, densely hairy. Peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, hairy; bracts small, caducous; flowers 2–4; pedicel hairy, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Sepals oval, acute, about $\frac{1}{2}$ in. long, densely hairy outside, margins ciliate. Corolla ample, purple, $1\frac{3}{4}$ in. long. Ovary glabrous.

South Central. Congo Free State: near Lake Moero, *Verdick*.

"Recalls *I. Grantii*, but differs in the smaller leaves, the longer-stalked inflorescence, the flowers springing from the same point, not arranged in a dichotomy, the pointed sepals and the longer and denser hairy covering."

121. **I. shirambensis,** *Baker in Kew Bulletin*, 1894, 72. Perennial, glabrous. Stems stout, woody, rugulose, climbing; final branchlets slender. Leaves orbicular, long, acuminate, base shallowly retuse, more or less pubescent on both surfaces, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, about $1\frac{1}{4}$ in. broad. Cymes laxly few- to many-flowered, sessile or shortly peduncled; pedicels slender, flexuose, $\frac{1}{2}$–$\frac{3}{4}$ in. long; bracts minute. Calyx glabrous, 5 lin. long; sepals coriaceous, ovate, cuspidate. Corolla funnel-shaped, $1\frac{1}{2}$ in. long, glabrous outside, white, with a bright lilac throat. Capsule glabrous. Seeds with long spreading tawny hairs.—*I. schirambensis*, Hallier f. in Engl. Jahrb. xxviii. 49.

Mozamb. Dist. German East Africa: Irangi, *Fischer*, 443, 453. Portuguese East Africa: Lower Zambesi, Shiramba, *Kirk*, 93! British Central Africa: Boruma, on the Zambesi, *Menyharth*, 1080! Nyassaland, *Buchanan*, 1952!

122. **I. gossypina,** *Deflers ex Hallier f. in Ann. Istit. Bot. Roma*, vii. 231. A climbing shrub, glabrous except the minutely puberulous younger branches. Branches elongated, slender, 1–1½ lin. thick, woody, terete, rugosely angled when dry, otherwise smooth, pale yellowish. Leaves (young ones only are present) broadly subcordate-ovate, with a long apical cusp as in *Ficus religiosa*, including the cusp (about ⅔ in. long), reaching nearly 2½ in. long and 1½ in. broad, base subtruncate, thin and membranous, grass-green above, subglaucous-green beneath, and densely reticulate with deeper green pellucid veins, palmately 5-nerved at the base, otherwise penninerved; petiole slender, 1 in. long. Flower and fruiting branches leafless. Peduncles solitary, generally racemosely arranged on short grey-silky branchlets, ½–2½ lin. long, 1-flowered, or rarely with a few-flowered cyme. Bracteoles squamiform, scarcely 1 lin. long; pedicel subclavate, about ½ in. long. Sepals subequal, chartaceous, ovate-elliptic, mucronulate, 4–5 lin. long, margin pellucid, membranous. Corolla showy, campanulate, 1¾ in. long; tube lilac, about 5 lin. broad; limb white; midpetaline areas well-defined, covered with white pubescence. Capsule elongated ovoid, ¾ in. long, ⅓ in. in diam., beaked with the persistent style base, glabrous, dull brown, 4-valved; pericarp thick, woody. Seeds clothed all over with a long silky fulvous tomentum.

Nile Land. Somaliland: Otalle, *Riva*, 1548.
Also in Arabia.

123. **I. lilacina,** *Bl. Bijdr. Ned. Ind.* xiii. 716. Perennial. Stem woody, twining, pubescent. Leaves entire, cordate-ovate, acuminate, reaching 3–4 in. long, sometimes becoming 3-lobed, green on both surfaces, slightly pubescent above, densely pubescent beneath when young, becoming less pubescent when older, 3 in. long. Peduncle 2 to nearly 5 in. long, pubescent, many-flowered; pedicels short; bracts ovate, minute. Calyx pubescent, 3–4 lin. long; sepals ovate, obtuse or minutely mucronate. Corolla funnel-shaped, bright purple, 1½–2 in. long; midpetaline areas sparsely hairy. Capsule globose, glabrous, ½ in. in diam. Seeds densely hairy.—Choisy in DC. Prodr. ix. 369; Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 100, and in Engl. Jahrb. xxx. 388; Hiern in Cat. Afr. Pl. Welw. i. 741. *I. Lindleyi*, Choisy in DC. Prodr. ix. 371. *I. riparia*, G. Don, Gen. Syst. iv. 265; Choisy in DC. Prodr. ix. 389. *I. fragrans*, Bojer, Hort. Maurit. 227 (name only); Hallier f. in Engl. Jahrb. xviii. 153. *I. Baclii*, Choisy in Mém. Soc. Genèv. viii. 60, t. 2, and in DC. Prodr. ix. 381. *I. oxyphylla*, Baker in Kew Bulletin, 1894, 71. *I. Stuhlmannii*, Dammer in Engl. Pfl. Ost-Afr. C. 333. *Pharbitis fragrans*, Bojer, l.c.; Choisy, l.c. 341.

Upper Guinea. Senegambia, *Leprieur & Perrottet*. Senegal, *Roger! Bacle!* Northern Nigeria: Nupe, *Barter*, 969! Fernando Po, *Vogel*, 241!

Nile Land. White Nile, below Schief, *Schweinfurth*, 1068! Fashoda,

Schweinfurth, 1096! Gazelle River, *Schweinfurth*, 1131! 1216! Bahr-el-Jebel, *Muriel*, 68! *Broun!* Uganda: Berkeley Bay, *Scott-Elliot*, 7068!

Lower Guinea. St. Thomas Island, *Don!* Lower Congo: by the Congo, *Smith!* Boma, *Dewèvre*, 80. Angola: Pungo Andongo, *Welwitsch*, 6229! by the River Quije, *Gossweiler*, 1109!

Mozamb. Dist. German East Africa: Khutu; Kisaki Steppe, *Goetze*, 76; Ugalla River, *Böhm*; Bukumbi, *Stuhlmann*, 828. Portuguese East Africa: east of Lake Nyasa, *Johnson*, 152! 338! Zambesi Delta: Luabo River, *Kirk!* banks of the Inagua, *Scott!* Katunga, Shire Valley, *Scott!* Kairuba Island, opposite Tete, *Kirk!* Muselo, *Kirk!* British Central Africa: Boruma, on the Zambesi, *Meyharth*, 1071! Nyasaland, *Buchanan!* Long Island, above Victoria Falls, *Eyles*, 140! Ngamiland, *Lugard*, 300! Lake Ngami, *McCabe*, 16! 37!

Also in the Mascarene Islands.

124. **I. hierniana,** *Rendle in Journ. Bot.* 1901, 58. Stems robust, softly woody, climbing, clothed like the leaves and calyx with very short grey pubescence. Leaves papery, exactly cordate, acuminate, apex weakly cuspidate, 2½–5 in. long, thinly pubescent to glabrescent on the upper surface, minutely grey pubescent, especially on the veins beneath; petioles slender, about as long as the blade, pubescent like the leaf-veins, inconspicuously glandular at the blade insertion. Peduncle very short, 1-2-flowered, ¼ in. long or less; pedicels ¼ in. long; bracts caducous, lanceolate, small, 1 lin. long. Sepals coriaceous, oblong, obtuse, subequal, ⅓ in. long, shortly grey tomentose on the back like the peduncle and peduncles, edges glabrous. Corolla funnel-shaped, glabrous, except at the tips of the midpetaline lobes, which bear dense short hairy tufts, 1½ in. long. Filaments long.

Upper Guinea. Cameroons: Bipinde, *Zenker*, 1614!

125. **I. Holubii,** *Baker in Kew Bulletin* 1894, 72. Perennial. Stems slender, woody, twining, clothed with dense white pubescence. Leaves entire, broadly cordate-ovate, obtuse, 1–2¼ in. long, up to nearly 2 in. broad, densely pubescent on both surfaces; petiole ¼–½ in. long. Flowers 1–3; peduncle slender, 1½–2 in. long, pubescent like the pedicels; pedicels short; bracts elliptic, subfoliaceous, densely pubescent, ¼–⅓ in. long. Calyx pubescent like the bracts, ⅓ in. long; sepals orbicular, obtuse, minutely mucronate. Corolla funnel-shaped, rose-purple, 2–3 in. long; limb 2¼ in. in diam. Fruit and seeds not seen.

Mozamb. Dist. British Central Africa: Southern Rhodesia; Leshumo Valley, *Holub*, 512! Panda ma Tenka, *Holub*, 969!

126. **I. rhodesiana,** *Rendle in Journ. Bot.* 1901, 57. Perennial. Stems probably climbing, reddish, grey-pubescent. Leaves shortly petioled, cordate-ovate, obtuse, under 1 in. long, to about ½ in. broad, grey tomentose on both surfaces, with a fulvous tinge on the upper, the curving lateral veins prominent beneath. Peduncle short, ¼ in. long, 1-flowered; bracts linear-oblong, small, 1½ lin. or less in length, remote from the calyx. Sepals unequal, broadly ellipsoid or obovate, ¼ in. long, the two inner longer than the three outer. Corolla unknown. Ovary glabrous.

Mozamb. Dist. Rhodesia; Buluwayo, *Rand*, 141!

Very near *I. Holubii*, but distinguished by its smaller leaves, bracteoles, and calyx. Perhaps only a small form of that species.

127. **I. shirensis,** *Oliv. in Hook. Ic. Pl. t.* 1474. Perennial. Stem woody, climbing, mottled with white tomentum. Leaves entire, cordate-ovate, obtuse, 2–4 in. long and broad, green and thinly pubescent above, matted all over with whitish tomentum beneath; petiole $1\frac{1}{2}$–2 in. long. Flowers in a lax panicle with cymose branches on long peduncles; pedicels as long as the calyx. Sepals oblong, obtuse, accrescent, at first tomentose, finally denuded, $\frac{1}{3}$ in. long, rigid and spreading. Corolla funnel-shaped, lilac, hairy, $\frac{3}{4}$–1 in. long. Capsule globose, densely tomentose, much shorter than the calyx, 1-seeded by abortion.—*Rivea shirensis*, Hallier f. in Engl. Jahrb. xviii. 157, and in Jahrb. Hamburg. Wissensch. Anstalt. xvi. Beih. 3, 14 (*schirensis*). *Porana subrotundifolia*, De Wild. Etudes Fl. Katanga, 111, t. 5, figs. 8–18.

Mozamb. Dist. British Central Africa: Nyasaland; Likangala River, near Lake Shirwa, 2500 ft., *Buchanan*, 262! Shibisa (Chikwawa) to Tshinmuzo, 2000–4000 ft., *Kirk!*

128 **I. digitata,** *Linn. Syst. Nat. ed.* 10, ii. 924. Perennial, with fleshy inedible tuberous roots. Stems wide-climbing, glabrous, woody, hollow. Leaves shallowly or deeply palmately 3–9-lobed, 4–8 in. long and broad; lobes blunt or subacute or acuminate, glabrous, base generally shallowly cordate; petiole long. Peduncle long; cymes compound, several- to many-flowered. Sepals broadly oblong to suborbicular, obtuse, much imbricate, glabrous, $\frac{1}{3}$–$\frac{1}{4}$ in. long. Corolla bright red-purple, campanulate-funnel-shaped, glabrous, 2–3 in. long; base darker inside; expanded limb 3–4 in. in diam. Capsule glabrous, globose, 4–5 lin. in diam.; valves membranous. Seeds $2\frac{1}{2}$ lin. long, covered with long tawny-white hairs.—Choisy in DC. Prodr. ix. 389; Hiern in Cat. Afr. Pl. Welw. i. 740. *I. paniculata*, R. Br. Prodr. 486; Ker in Bot. Reg. t. 62; Hallier f. in Engl. Jahrb. xviii. 149; De Wild. Études Fl. Katanga 113. *I. ennealoba*, P. Beauv. Fl. Owar. ii. 69, t. 101; Choisy in DC. Prodr. ix. 388. *Batatas paniculata*. Choisy l.c. 339; Benth. in Hook. Niger Fl. 464. *Convolvulus paniculatus*, Linn. Sp. Pl. ed. 1, 156; Schumach. & Thonn. Beskr. Guin. Pl. 94.

Upper Guinea. Gambia, Ile au Chiens, near St. Mary's, *Leprieur & Perrotet*, 511! Sierra Leone, *Afzelius! Vogel*, 96! *Scott-Elliot*, 4194! Gold Coast: Accra, *Krause*, 9. Cape Coast Castle, *Vogel*, 80! Chama, *Beaurois*. Togo, *Kling*, 21; *Warnecke*, 244! *Büttner*, 82. Lagos: Lokaja and Abeokuta, *Nigeod*! and without precise locality, *Rowland! Phillips*, 30! *Millen!* Northern Nigeria: Nupe. *Barter*, 1267! Cameroons: Efulen, *Bates*, 284! Batanga, *Bates*, 326! Yaunde. *Zenker & Staudt*, 353! and without precise locality, *Preuss*, 547!

Nile Land. Niamniam, Nabambisso River, *Schweinfurth*, 3844! Bongo, *Schweinfurth*, 1289! 2214! Somaliland, *Kirk!*

Lower Guinea. St. Thomas Island, *Quintas*, 58. Lower Congo: Island of San Antonio, *Smith!* Banana Creek, *Monteiro!* Kisantu, Tondoa, *Büttner*, 385; *Gillet*, 114; Bingila, *Dupuis*. Angola: San Salvador, *Büttner*, 384; Ambriz,

Quizembo, *Welwitsch*, 6241! Barra do Bengo, *Welwitsch*, 6242! Pungo Andongo; Mata de Pungo, *Welwitsch*, 6163! Condo, *Welwitsch*, 6222!

South Central. Congo Free State: Katanga; Lofoi, *Verdick*. Sankuru, *Laurent*. Lualaba River, *Pogge*; Lulua River, *Pogge*.

Mozamb. Dist. Portuguese East Africa: Zambesi Delta; Kongone River, *Kirk!*

Cosmopolitan in the tropics.

Var. *eriocarpa*, Rendle. Leaves entire, cordate-ovate, acute.—*I. camerunensis*, Taubert in Gartenfl. 1891, 393, t. 1352. *I. eriosperma*, P. Beauv. Fl. Owar. ii. 73, t. 105. *I. paniculata*, var. *indivisa*, Hallier f. in Bull. Herb. Boiss. v. 378, and in De Wild. & Durand, Contr. Fl. Congo, 43; var. *eriocarpa*, O. Kuntze, Rev. Gen. Pl. ii. 445; Hallier f. in Engl. Jahrb. xviii. 150.

Upper Guinea. By the sea from Chama, Gold Coast, to Formosa (Benin) River, in Southern Nigeria, *Beaurois*. Cameroons: Batanga, *Dinklage*, 770. Fernando Po, *Mann*, 422!

Lower Guinea. Lower Congo: *Dewèvre*. Gaboon: Munda, *Soyaux*, 389!

129. **I. marmorata,** *Britten & Rendle in Journ. Bot.* 1896, 36. Stems woody, glabrous, grey puberulous at the extreme tip. Leaves reniform or suborbicular from a reniform base, 3–5 in. broad, 2–2½ in. long, apex rounded or retuse, veins sparsely tomentose on the upper surface, conspicuously clothed with white tomentum on the lower, the rest of the leaf almost glabrous, a pair of glandular areas just above the petiole-insertion on the under surface; petiole nearly or quite as long as the blade. Peduncles short, 1-flowered, ¼ in. long; bracts deciduous. Calyx glabrous; pedicel a little over ½ in. long or nearly 1 in. long; sepals coriaceous, ovate-oblong, obtuse, the two outer rather shorter. Corolla 5 in. long; tube slender, ¼ in. in diam., about 3½ in. long. Stem dilated (withered in specimen). Stamens and style reaching to the top of the tubular part of the corolla.—Hallier f. in Ann. Istit. Bot. Roma, vii. 232.

Nile Land. Somaliland: Harar, *Robecchi-Bricchetti*, 32. British East Africa: Lake Stefanie, *Donaldson-Smith!*

130. **I. grandiflora,** *Lam. Ill.* i. 467. Stems wide-climbing, smooth, or muricate with herbaceous papillæ. Leaves cordate-orbicular, cuspidate, membranous, glabrous, 4–6 in. long and broad; petiole about as long as or shorter than the blade. Peduncles 1–3-flowered; bracts small, deciduous. Sepals coriaceous, broadly elliptic, apex rounded, glabrous, much imbricate, ¾ in. long. Corolla white; tube cylindrical, 2½ in. long, ¼ in. in diam.; expanded limb about 3 in. in diam. Capsule subglobose, 1 in. in diam. Seeds lenticular, with a shaggy border and glabrous faces.—Hallier f. in Engl. Jahrb. xviii. 153. *I. glaberrima*, Boj. Hort. Maurit. 228. *Calonyction grandiflorum* and *C. asperum*, Choisy in DC. Prodr. ix. 346. *C. comosperma*, Boj. l.c.; Choisy l.c.

Mozamb. Dist. German East Africa: Rovuma Bay, *Kirk!*

Also in Tropical Asia, Polynesia, and the Mascarene Isles.

131. **I. lapidosa,** *Vatke in Linnæa*, xliii. 507. A woody climber, with elongated climbing stems, from which the leaves soon fall, and

short straight leafy branches, the upper part of the shoots and the nerves on the young leaves beneath bearing white pubescence. Leaves cordate-ovate, obtuse, mucronulate, base shallowly cordate, about 3 in. long by $2\frac{1}{2}$ in. broad, glabrous, the older leaves slightly bullate; petiole slender, a little shorter than the blade, with a large gland on each side at the back of the leaf-insertion. Peduncles axillary, standing raceme-like in the axils of the upper leaves of the short shoots, 1-flowered, about $\frac{1}{3}$ in. long, becoming 1 in. or more in fruit; pedicels slightly longer, thickening slightly upwards. Calyx glabrous, tubular; sepals elliptic-oblong, obtuse or emarginate, 7–8 lin. long, coriaceous, dark brown, the edges thinner and lighter in colour, becoming more than 1 in. long in the fruit. Corolla showy, salver-shaped, white, glabrous, $3\frac{1}{2}$–4 in. long; tube cylindric, $2\frac{1}{4}$ in. long, about $\frac{1}{4}$ in. in diam. Ovary 4-celled. Capsule large, about $\frac{3}{4}$ in. long, subquadrangular-ovoid, glabrous, dark brown, 4-valved, 4-seeded; valves tough and rather woody, a pale shining straw-colour on the inside. Seeds clothed with a long white somewhat silky indumentum, and including the tomentum nearly as long as the capsule.—Hallier f. in Engl. Jahrb. xviii. 151 and xxviii. 51; Dammer in Engl. Pfl. Ost-Afr. C. 333.

Nile Land. British East Africa: Mtoui River, *Kässner*, 629! Ukamba; Kitui, *Hildebrandt*, 2760.

Mozamb. Dist. German East Africa: near the Victoria Nyanza, between Mwanza Gulf and Emin Pasha Gulf, *Trotha*, 112.

132. **I. longituba,** *Hallier f. in Sitzungsber. Akad. Wiss. Wien.* cvii. 49. A robust shrub. Stems thick, woody, the younger minutely but densely grey tomentose, the older $\frac{1}{3}$ in. thick, terete, glabrescent, yellowish, shining, rough when dry. Leaves orbicular, retuse, with truncate or subcordate base, 3 in. long, nearly as broad, covered on both surfaces when young with dense grey tomentum, ultimately glabrescent above, with sparse arachnoid tomentum beneath; petiole up to $2\frac{1}{2}$ in. long, 1 lin. thick, tomentose when young like the leaves, with on each side at the base of the lamina a long inconspicuous nectary. Flowers forming a dense many-flowered spike, with small young leaves at the end of the shorter shoots from which the older leaves have fallen. Peduncles up to $\frac{1}{2}$ in. long, terete, thick, grey-tomentose, 1-flowered; subtending leaves petioled, oblong, $1\frac{1}{4}$ in. long, glabrous above, white on the margin, covered with white tomentum beneath especially on the nerves, beset with dense capitate glands and strongly bullate. Pedicel subclavate, 3–5 lin. long, like the sepals, glabrous or sparsely pulverulent, bearing a pair of opposite minute elongate triangular subobtuse bracts. Sepals 6–7 lin. long, about $\frac{1}{4}$ in. broad, elongate-elliptic, obtuse or emarginate, coriaceous, yellowish-green, with paler membranous margin, the two outer shorter. Corolla salver-shaped, white; tube slender, cylindrical, $3\frac{1}{2}$–4 in. long, 2–$2\frac{1}{2}$ lin. in diam., expanding above into a broad subrotate 5-lobed limb, about 3 in. in diam.; midpetaline areas plainly limited, yellowish. Stamens and style included, about equal to the tube; anthers linear, $\frac{1}{3}$ in. long. Capsule large, ovoid, nearly 1 in. long, beaked with the persistent style-base, glabrous, shiny, dark

brown, 4-valved; valves thick, "testaceo-lignous." Seeds 5 lin. long, clothed, except on the black glabrous back, with soft whitish-fulvous silky wool, $\frac{2}{3}$ in. long.

Nile Land. Somaliland: near Banas, *Riva*, 1437, 1438 partly. British East Africa: Athi Plains, *Pospischil*.

133. **I. stenosiphon,** *Hallier f. in Situngsber. Akad. Wiss. Wien.* cvii. 50. A shrub; stems terete, glabrous, some sterile, slender, whip-like and climbing, with a smooth thin ochre-coloured separable bark; others more robust, straight, erect, densely leaved and flowering, greyish, bark rugose. Leaves cordate-ovate, emarginate, mucronate, up to $2\frac{1}{2}$ in. long by a little over 2 in. broad, sparsely puberulous on the upper surface and on the nerves beneath; lateral nerves about 10 each side of the flattened narrowly winged (on the lower surface) midrib, conspicuously reticulate beneath the meshes of the network conspicuously dotted with numerous dark circular glands; petiole slender, nearly as long as the leaf, glandular on each side below the blade. Peduncles on very short branchlets, solitary or few and fascicled and almost obsolete; pedicels $\frac{3}{4}$–2 in. long, conspicuously clavate in fruit. Sepals coriaceous, elliptic, obtuse or emarginate, with membranous pellucid margin, the outer much shorter, $\frac{1}{2}$ to barely 1 in. long in flower; much enlarged in fruit becoming brittle and laxly enveloping the capsule. Corolla large, pale greenish-yellow or cream-colour, salver-shaped; tube very narrow, 4–5 in. long, 1–$1\frac{1}{2}$ lin. in diam.; limb about $1\frac{1}{4}$ in. broad; midpetaline areas with white wool on the outside at the apex. Stamens and style projecting considerably from the tube; anthers 2 lin. long. Ovary glabrous, 4-celled; cells 1-ovuled. Capsule elongated cone-shaped, dirty brown, cuspidate with the long persistent style-base, $1\frac{3}{4}$ in. long, including the cusp (about $\frac{1}{2}$ in. long), about $\frac{1}{2}$ in. broad; pericarp thin, brittle, not splitting into valves, 3- to 1-celled by abortion; septa thinly membranous not separating from the pericarp. Seeds oblong, about $\frac{1}{2}$ in. long and $\frac{1}{4}$ in. thick, obscurely obtusely trigonous, dirty brown, velvety with a tuft of longer ochre-coloured hairs around the hilum.—*Rivea stenosiphon*, Hallier f. in Jahrb. Hamburg. Wissensch. Anstalt. xvi. Beih. 3, 15. *Rivea* (sect. *Legendrea*) sp., Hallier f. in Engl. Jahrb. xviii. 158.

Nile Land. British East Africa: north of Taveta, *Pospischil*.

Mozamb. Dist. German East Africa: Massaini, *Fischer*, 416; Usagara; Mlali, *Stuhlmann*, 198; Pangusi, *Stuhlmann*,. 427; Muansa, *Stuhlmann*, 4151. British Central Africa: Rhodesia; Matoppo Hills, 5000 ft., *Eyles*, 58!

The corolla resembles that of *I. Bona-nox*, but is somewhat smaller; there is no suggestion in the flower of a thickening of the pedicel which characterises the fruiting stage of that species. Our plant is evidently very near *I. longituba*, Hallier f., but is distinguished by its more typically cordate leaves, rather longer corolla-tube and exserted stamens and style.

134. **I. bullata,** *Oliv. in Trans. Linn. Soc. ser.* 2. *Bot.* ii. 343, *t.* 62. Stems robust, woody, hollow, wide-climbing, at first slightly pubescent. Leaves distinctly petioled, 3–4 in. long and broad, cut down nearly to the midrib into 7–9 obtuse or subacute linear lobes, the longest 2 in.

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PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR THE COLONIES.

LONDON:

LOVELL REEVE & CO., LIMITED

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long, 4 lin broad, conspicuously crenate, bullate between the lateral veins, green and glabrescent above, pubescent beneath, especially on the veins. Cymes shortly peduncled, laxly 2–3-flowered ; peduncles stout ; pedicels as long as the calyx ; bracts small, 3 lin. long, spathulate, ciliate above. Calyx glabrescent, 6–9 lin. long ; sepals elliptic, much imbricate. Corolla funnel-shaped, red-purple, 3–4 in. long ; tube slender ; limb $2\frac{1}{2}$–3 in. in diam.—Hallier f. in Engl. Jahrb. xviii. 151.

Nile Land. British East Africa : Kilimanjaro Expedition ; 40–60 miles from the coast, *Johnston !*

Mozamb. Dist. German East Africa : Unyamwezi ; near Tura (Tabora), 4000 ft., *Speke & Grant !*

135. **I. pyramidalis,** *Hallier f. in Engl. Jahrb.* xviii 152. A perennial undershrub. Stems woody, 5 to 12 from each rootstock, decumbent-ascending, simple, rigid, terete, clothed like the rest of the plant with soft grey velvety pubescence. Leaves distinctly petioled, orbicular-ovate, cordate at the base, apex shortly subacute, deflexed, grey-velvety on both surfaces, paler beneath, with a pair of glandular areas just above the petiole-insertion. Peduncles exceeding the petioles, and reaching over 2 in. in length, usually 3-flowered, springing in the axils of the upper leaves, the whole forming a terminal paniculate inflorescence ; bracts large, elliptic to obovate, nearly 1 in. long, membranous, pubescent, enveloping the calyx. Sepals membranous, elliptic to subobovate, $\frac{2}{3}$ in. long, subequal, silky. Corolla silky outside in bud, funnel-shaped, rose-red ; tube shining purple inside $1\frac{3}{4}$ in. long ; midpetaline areas densely silky.—Hiern in Cat. Afr. Pl. Welw. i. 741. *I. megalochlamys,* Baker in Kew Bulletin, 1894, 72.

Lower Guinea. Angola : Huilla ; Lopollo, *Welwitsch,* 6113 ! and about Lake Ivantalla, *Welwitsch,* 6113b !

136. **I. Hildebrandtii,** *Vatke in Linnæa,* xliii. 511. Stems woody, suberect, 3–4 ft. long, terete, clothed with soft grey velvety pubescence. Leaves cordate-ovate, subentire, 2–4 in. long and reaching 3 in. in width, glabrous above, clothed with grey silky pubescence below, and having a pair of conspicuous gland-areas above the petiole; margins whitish ; petiole 1–$1\frac{1}{2}$ in. long. Peduncles strong, much longer than the petiole, up to 4 in. long, bearing many flowers crowded in a repeatedly forked cyme. Bracts membranous, the lower elliptic-ovate, the upper becoming elliptic-lanceolate, subobtuse, pubescent on the back, $\frac{3}{4}$ in. long or less. Sepals toughly membranous, pubescent outside, elliptic, obtuse to subacute, 10 lin. long, the inner slightly shorter, abruptly acute. Corolla whitish ; tube rose-coloured, broadly funnel-shaped up to $3\frac{1}{2}$ in. long ; expanded limb 4 in. in diam. ; mid-petaline areas sparsely puberulous. Capsule globose. Seeds covered with brown woolly hairs.—Hallier f. in Ann. Istit. Bot. Roma, vii. 233. *I. decora,* Vatke & Hildebr. in Monatschr. Ver. Garten. Preuss. Stat. xxii. (1879) 132, t. 2, not of Meissn. *Rivea decora,* Hallier f. in Engl. Jahrb. xviii. 156.

Nile Land. Somaliland ; near Banas, *Riva,* 1429. Uganda : five days' march from Mumias, *Whyte !* British East Africa : Taita, *Hildebrandt,* 2843 ;

Fischer, 122. Kibwezi, *Kässner*, 693! Ukamba, 5000–6000 ft, *Scott-Elliot*, 6723!

Mozamb. Dist. German East Africa: between the coast and Uyui, *Taylor!*

137. **I. incomta,** *Hallier f. in Engl. Jahrb.* xviii. 151. A woody climber. Stems rather slender, terete, densely clothed with short spreading silvery pubescence. Leaves cordate-ovate, acutely cuspidate, $3\frac{1}{2}$–9 in. long, and nearly as broad, membranous, densely clothed beneath with persistent silvery pubescence; petiole nearly as long as the blade. Peduncles stout, pubescent like the stems and bearing a few-flowered cyme; pedicels 1–$1\frac{3}{4}$ in. long. Calyx densely pubescent; outer sepals ovate, subobtuse, lower portion shaggy, $1\frac{1}{4}$ in. long; inner much shorter. Corolla regularly funnel-shaped, $3\frac{1}{2}$ in. long; limb spreading widely, not distinctly lobed. Stamens half as long as the corolla. Fruit not seen. —*I. althoffiana*, Dammer in Engl. Pfl. Ost-Afr. C. 333.

Nile Land. British East Africa: between Ribe and the Galla country, *Wakefield!* near the British-German boundary, *Smith!*

Mozamb. Dist. Zanzibar: Kokotoni, *Stuhlmann*, 110. German East Africa: Usambara; Lutindi, 1500 ft., *Holst*, 3447!

138. **I. Donaldsoni,** *Rendle in Journ. Bot.* 1896, 37. An erect shrub. Branchlets blackish, woody, spreading, ending in spines. Leaves on dwarf shoots on the woody branches, minute, reniform, $\frac{1}{6}$ in. long, $\frac{1}{4}$ in. broad, folded upwards along the midrib, sparsely hairy on the upper surface, pubescent on stalk and lower; petiole as long as the blade. Flowers solitary, axillary; pedicels up to $\frac{1}{4}$ in. long. Calyx 1–2 lin. long; sepals rather thick, glabrous on the back, ciliate on the margin, broadly oval to suborbicular, the two outer shorter than the three inner. Corolla broadly funnel-shaped, 8–9 lin. long, white or pale purple; midpetaline areas well defined, pubescent. Stamens 3–4 lin. long; filaments hairy, dilated at the base.—Hallier f. in Ann. Istit. Bot. Roma, vii. 232. *I. Ghikæ*, Schweinf. & Volk. in Liste Pl. Somalis, 10, and Ghika, Pays des Somalis, 209.

Nile Land. Somaliland: Okoti and Schebele, *Donaldson-Smith!* Wagga Mountain, *Mrs. Lort Phillips!* Near Logh, on the Ganane River, *Riva*, 1148. River Salul and valley of the River Faf, *Ghika.*

Var. *pubicalyx*, Hallier f. in Ann. Istit. Bot. Roma, vii. 232. Calyx scarcely 1 lin. long, like the pedicel covered with a dense grey pubescence. Corolla barely $\frac{2}{3}$ in. long; tube lilac? limb white?

Nile Land. Galla Country: Aloi on the River Daua, *Riva*, 233.

139. **I. cicatricosa,** *Baker in Kew Bulletin*, 1895, 221. Stems shrubby, 2 ft. long, erect, younger portions and branches clothed with silvery tomentum and rough with the scars of fallen leaves. Leaves shortly petioled, ovate, obtuse, entire, 1–2 in. long, $\frac{2}{3}$–$1\frac{1}{3}$ in. broad, rounded at the base, green and obscurely silky above, densely silvery beneath. Flowers solitary, sessile in the axils of the leaves. Sepals subequal, narrowly lanceolate, $\frac{1}{4}$ in. long, densely white-silky. Corolla $1\frac{1}{2}$ to nearly 2 in. long, campanulate-funnel-shaped, mauve; midpetaline

areas well-marked, pulverulent-pubescent. Stamens nearly half the length of the corolla.—Schweinf. & Volk. Liste Pl. Somalis, 11, and in Ghika, Pays des Somalis, 211; Hallier f. in Ann. Istit. Bot. Roma, vii. 236.

Nile Land. Somaliland: Adda Galla, *James & Thrupp!* Golis Range, *Miss Edith Cole! Mrs. Lort Phillips!* Wagga Mountain and Bihen, *Mrs. Lort Phillips!* by the Rivers Jerer, Faf, Salul, and Dajelto, *Ghika.* Adadle, *Keller*, 231; Acadess, *Riva*, 356; Ogaden, *Riva*, 938; Haleina, *Riva*, 1578.

140. **I. argyrophylla,** *Vatke in Linnæa*, xliii. 510. An erect much-branched shrub, about 1½ ft. high; branches slender, clothed with silvery tomentum. Leaves crowded, narrowing into a short petiole, 1½ lin. long; blade narrowly lanceolate, obtuse, entire, up to 1¼ in. long, green and glabrous above, densely clothed beneath with silvery silky tomentum, as also are the bracteoles and sepals. Peduncles short, 1-flowered, silkily tomentose. Bracteoles linear, ⅓ in. long. Sepals subequal, 7 lin. long, lanceolate, acuminate. Corolla funnel-shaped, purple, probably 1½ in. long; midpetaline areas of the limb with the characteristic silvery hairs. Capsule ovoid, obtuse, glabrous; seeds dull brown, glabrescent.—Engl. Hochgebirgsfl. Trop. Afr. 346; Hallier f. in Sitzungsb. Akad. Wien. Math.-Nat. cvii. 51. *Rivea argyrophylla*, Hallier f. in Engl. Jahrb. xviii. 157.

Nile Land. Somaliland: Serut Mountains, near Maid, 5000–6000 ft., *Hildebrandt*, 1414!

Near *I. cicatricosa*, Baker, but distinguished by the narrower leaves.

Var. *glabrescens*, Hallier f. in Sitzungsb. Akad. Wien. Math.-Nat. cvii. 51. More robust than the species, the adult branches reaching 2 lin. in thickness and glabrous, yellowish and shining, rough on drying. Leaves glabrescent below, reaching, together with the petiole, 1½ in. in length. Calyx ⅓ in. long. Corolla 2 in. long; limb 1¾ in. wide.—*Rivea nana*, Hallier f. in Engl. Jahrb. xviii. 157.

Nile Land. British East Africa: Athi Plains and Machakos, *Pospischil.*

Mozamb. Dist. German East Africa: Masailand, *Fischer*, 103.

Var. *brevisepala*, Rendle. Tough, woody; branches nearly 2 lin. thick, glabrous below and inconspicuously pubescent above, studded with the persistent remains of the short leaf-bearing branchlets. Leaves oblanceolate, obtuse, barely ½ in. long, plicate, densely pubescent on the under surface. Flowers solitary, axillary, subsessile; bracteoles small, narrow. Sepals lanceolate-acuminate, subequal, ⅓ in. long. Corolla funnel-shaped with a broad tube. Capsule globose, blackish, glabrous, about 5 lin. in diam.; seeds dull brown, barely 1½ lin. long, surface minutely areolated.

Nile Land. British East Africa: Ulu; Lanjora, 5500 ft.; a small shrub, growing on rock, *Scott-Elliot*, 6377a!

Resembles the species in habit, but is distinguished by its smaller leaves and much shorter sepals.

141. **I. adenioides,** *Schinz in Verhandl. Bot. Ver. Brandenb.* xxx. 270. An erect shrub or undershrub, 1–5 ft. high; the young branches and under-surface of the young leaves clothed with short white silky hairs. Leaves suborbicular or obovate with cuneate base, entire, 1–2 in. long, subobtuse, glabrescent above, silky beneath, especially when young;

petiole ½ in. long. Flowers solitary, on short pedicels, or up to 4 on a short-peduncled raceme-like inflorescence; bracts linear to linear-lanceolate, acute, about ⅔ in. long. Sepals subequal, lanceolate, long acute, 8–10 lin. long, densely silvery silky on the outside. Corolla 3–4½ in. long; tube cylindrical; limb funnel-shaped, about 1½ in. in diam., scarcely lobed; tube and midpetaline areas of limb silky outside. Capsule globose, rather hairy. Seeds 3, 1 in. long and broad, clothed with long shining clear brown hairs.—*I. Marlothii*, Engl. Jahrb. x. 244. *Rivea adenioides*, Hallier f. in Engl. Jahrb. xviii. 156.

Lower Guinea. German South-west Africa: Hereroland; Usaka, 3000 ft., *Marloth*, 1250. Amboland; Ombalambuenge, *Rautanen*, 160! Korikas Flag, *Belck*, 21. Near Otyitambi, *Gürich*, 10; *Lüderitz*, 116.

Mozamb. Dist. British Central Africa: Lake Ngami, *McCabe*, 44! Northern Kalahari Desert; near Chukutsa Salt-pan, *Lugard*, 224! near Palapye, *Lugard*, 265!

Var. *ovato-lanceolata*, Hallier f. in Ann. Istit. Bot. Roma, vii. 235. Leaves ovate-lanceolate, generally acute, with somewhat obtuse base, up to 3½ in. long by 1½ in. broad.

Nile Land. Somaliland: Nogal, *Robecchi-Bricchetti*, 499.

142. **I. kituiensis,** *Vatke in Linnæa*, xliii. 511. Perennial, shrubby. Stems erect or climbing, hollow, up to ⅓ in. thick, pubescent, leaf-scars prominent. Leaves reniform-cordate, very obtuse, shortly apiculate, reaching nearly 6 in. in width, clothed with adpressed hairs beneath, similarly but sparsely hairy or glabrous above; petioles pubescent, varying in length, often as long as or longer than the leaves. Peduncles rigid, robust, terete, pubescent, up to 6 in. long, bearing a diffuse corymbose dichasium; flowers more or less crowded; bracts linear, acute, about ½ in. long, covered with white silky hairs like the sepals. Sepals tapering upwards, acute, unequal, the outer above ½ in. long. Corolla funnel-shaped, rose-purple, passing into white above, 2–3 in. long, thinly silky on the well-defined midpetaline areas. Capsule ⅓ in. in diam.; seeds long hairy.—Hallier f. in Engl. Jahrb. xxviii. 53. *I. tambelensis*, Baker in Kew Bulletin, 1894, 72. *Rivea kituiensis*, Hallier f. Engl. Jahrb. xviii. 156 (excluding plant from Usambara, *Holst*, 415); Dammer in Engl. Pfl. Ost-Afr. C. 334.

Nile Land. British East Africa: Ukamba, *Hildebrandt*, 2759; *Gregory!* Kibwezi, *Kässner*, 709!

Mozamb. Dist. German East Africa: Muansa, by Lake Victoria, *Stuhlmann*, 4559; Usambara; Pangani, 2500 ft., *Volkens*, 460! Ugogo-Usagara, *Trotha*, 207. British Central Africa: Nyasaland; near Tambala, on the upper Shire River, *Kirk!*

A specimen collected in Kavirondo, Uganda, by Mr. Scott-Elliot (6991) may represent a distinct species. The leaves are glabrescent, oblate, about 1½ in. long by 2¼ in. broad, the apex obscurely mucronulate, and the base subtruncate. The peduncles are less floriferous, with more congested flowers, and the sepals slightly broader at the base (1½ lin.).—See Rendle in *Journ. Bot.* 1901, 57.

143. **I. nyikensis,** *Hallier f. in Engl. Jahrb.* xxviii. 53. An erect (?) shrub; branches robust, terete, hollow, covered like the petioles

and younger peduncles with yellow tomentum. Leaves large, orbicular-cordate, sharply acuminate, entire, dull green above and glabrous except on the pubescent nerves, silvery silky below even in the adult, $4\frac{3}{4}$ in. long and nearly as broad; petiole 4 in. long in a not fully grown specimen. Peduncles axillary, rigid, robust, terete, about $1\frac{1}{2}$ lin. thick and 8 in. long, terminating in corymbose many-flowered dichasia passing into contracted monochasia; corymb 4 in. in diam. Bracts in the monochasia distichous, linear-lanceolate, like the sepals silvery silky on the outside, the lowest 7 lin. long, scarcely exceeding 1 lin. broad. Sepals lanceolate tapering upwards, the three outer larger, $7\frac{1}{2}$ lin. long to $2\frac{1}{2}$ lin. broad. Corolla funnel-shaped, 2 in. long, about $1\frac{1}{2}$ in. broad, bearing on the outside scattered spreading stiffish grey hairs; midpetaline areas bounded by strong nerves, and with a conspicuous median nerve. —*Rivea kituiensis*, Hallier f. in Engl. Jahrb. xviii. 156, and Dammer in Engl. Pfl. Ost-Afr. C. 334 as to the Usambara specimen.

Mozamb. Dist. German East Africa: Usambara; Nyika, *Holst*, 415.

Near *I. kituiensis*, from which it is distinguished by the silvery silky covering on the back of the leaves and bracts, and the broader sepals. (Hallier, *l.c.*, says it is also distinguished by the conspicuously shorter corolla, but the corolla in the specimen from Kilimanjaro (Volkens, 460) which he refers to *I. kituiensis* is only 2 in. long.)

144. **I. chrysosperma,** *Hallier f. in Ann. Istit. Bot. Roma*, vii. 234. An erect (?) shrub with robust terete rough ochre-coloured branches, which, except the young shoots, are glabrous. Leaves large, orbicular-cordate, obtuse, palmately 7-nerved at the base, green above, with dense adpressed grey pubescence beneath, $4\frac{1}{3}$ in. long, $4\frac{3}{4}$ in. broad; petiole robust, densely grey-pubescent, $1\frac{2}{3}$ in. long, bearing a black wedge-shaped nectary on each side at the apex. Peduncles solitary at the leaf-scars, crowded almost in an umbel below the new branches, robust, corymbose, reaching with the branches a length of $4\frac{3}{4}$ in., repeatedly dichotomous, jointed at the scars of the fallen lower flowers; flowering branchlets bearing like the bracts and sepals an adpressed grey tomentum, fruiting branchlets almost glabrous like the branches. Upper flowers only remaining, solitary and subsessile at the joints of the peduncles; bracts and bracteoles deciduous, resembling and equal to the sepals, grey tomentose on the outside. Sepals equal, linear-lanceolate, about $\frac{1}{4}$ in. long, scarcely 1 lin. broad. Corolla (young) with tube coloured (?) limb pale, grey pubescent on the outside, except on the commissural segments; midpetaline areas bounded by strong nerves. Capsule subtended by the reflexed persistent sepals, globose, glabrous, very closely and minutely striate, ochre-coloured, $7\frac{1}{2}$ lin. long, 4-valved, the 4 cells each 1-seeded; valves thick testaceous-woody; seeds trigonous, $\frac{1}{4}$ in. long, with a tawny silky covering much longer on the two lateral angles.

Nile Land. Somaliland; near Banas, in dry gravelly places, *Riva*, 1438 partly.

Very near *I. kituiensis*, but distinguished by the much smaller bracts and sepals.

145. **I. urbaniana,** *Hallier f. in Sitzungsb. Akad. Wien. Math.-Nat.* cvii. 52. Stem climbing, somewhat sparsely covered like the peduncle and petiole with short adpressed hairs. Leaves thin and papery when dry, broadly oval to ovate, shortly acute or acuminate, base rounded, reaching 6 in. long by 4 in. broad, glabrescent and granular on the upper surface when mature, sparsely adpressed pilose beneath; lateral veins about six each side, slender and slightly prominent on the upper surface; petiole shorter than the blade (up to $3\frac{1}{2}$ in. long) glandular just below the blade. Peduncle up to 5 in. long, bearing a dense-flowered cyme. Sepals narrowly linear-lanceolate, acute, 5 lin. long, barely 1 lin. broad at the base, the back covered with short adpressed hairs. Corolla narrowly funnel-shaped, rose-coloured, $2\frac{1}{2}$–$2\frac{3}{4}$ in. long; midpetaline areas sparsely covered with short adpressed hairs and with a short apical tuft. Disc large cupshaped, covering the globose ovary. Fruit and seeds unknown.—*Rivea urbaniana,* Dammer in Engl. Pfl. Ost-Afr. C. 334.

Mozamb. Dist. German East Africa: Usambara; Doda, *Holst,* 2978!

146. **I. spathulata,** *Hallier f. in Ann. Istit. Bot. Roma,* vii. 234. A partly climbing shrub; branches robust, terete, yellowish, covered when young like the petioles and peduncles with dense spreading grey pubescence, elongated into leafless climbing shoots. Leaves large, orbicular-cordate, obtuse, herbaceous, subpalmately 7-nerved at the base, subglaucous-green above and densely clothed with minute papillæ, rather silky beneath with dense adpressed grey pubescence, $2\frac{3}{4}$ in. long, $3\frac{1}{4}$ in. broad; petiole up to 2 in. long. Peduncles solitary in the leaf-axils, robust, terete, nearly 3 in. long, twice dichotomous, the two primary branches (nearly 3 in. long) bearing each a pair of cincinni up to 2 in. long. Bracts broadly ovate-spathulate, yellowish-green with soft grey hairs, 6–7 lin. long and nearly 5 lin. broad. Flowers large, subsessile. Sepals pale green, grey silky at the base, unequal, the two outer longer, spathulate, 5 lin. long, 2 to $2\frac{1}{2}$ lin. broad below the apex, median sepal more narrowly spathulate, the two inner narrower and nearly one-third shorter, linear from a broader base. Corolla (unopened) more than $1\frac{1}{4}$ in. long, with grey stiffish hairs except on the commissural segments; midpetaline areas bounded by strong nerves. Capsule and seeds exactly as in *I. chrysosperma.*

Nile Land. Somaliland: dry wooded places from Imi to Audo near the confines of the Galla Arussi territory, *Riva,* 1049; near Imi, *Riva,* 1670. Uganda: Eldama Ravine, 7000–7500 ft., *Whyte!*

Very near *I. chrysosperma,* from which it is distinguished by the subclimbing habit and larger spathulate bracts and sepals. Whyte's plant is referred to this species, as it agrees very fairly with Hallier's description based on the Somaliland plant which we have not seen. It has fully opened flowers with corolla $2\frac{1}{2}$ in. long, funnel-shaped with a broad purplish tube and a pale limb.

147. **I. Hartmanni,** *Vatke in Linnæa,* xliii. 514. Perennial. Stems woody, densely clothed with deflexed tawny hairs. Leaves entire, cordate-orbicular, 3–4 in. long and broad, obtuse, green and obscurely pubescent above, matted with adpressed whitish hairs

beneath; petiole 1–2 in. long. Peduncle $5\frac{1}{2}$ in. long; flowers several (6) in a dichasial cyme; pedicels 2 lin. long; bracts minute, lanceolate. Flower-buds ovoid, densely strigose. Calyx 4–5 lin. long, hirsute on back and margin. Sepals subcoriaceous, lanceolate to ovate, acute, Corolla funnel-shaped, $2\frac{1}{2}$ in. long, whitish with a purple throat; mid-petaline areas strigose. Fruit and seeds not seen.—*Rivea Hartmanni*, Hallier f. in Engl. Jahrb. xviii. 156.

Nile Land. Brtish East Africa: Ndi Mountain, *Hildebrandt*, 2564!

148. **I. Mahoni,** *C. H. Wright in Gard. Chron.* 1903, xxxiii. 257. A large erect shrub. Stem terete, at first pubescent. Leaves oblong, obtuse at base and apex, entire, $1\frac{3}{4}$ in. long, 1 in. broad, glabrous above, pubescent beneath, ciliate; petiole $\frac{3}{4}$ in. long, hairy at first, channelled above. Flowers solitary, peduncle short, thick; bracteoles 2, lanceolate, $\frac{1}{2}$ in. long. Sepals lanceolate, acute, unequal, pubescent. Corolla campanulate, funnel-shaped, more than 3 in. in diam., red-purple below and on the ribs, white or very pale purple above. Stamens very unequal. Style shorter than the stamens.

Nile Land. Uganda, *Mahon*, 83.

Described from small specimens raised from seed at Kew, which formed flowers when only 4 inches high. Unfortunately no specimens were preserved, and at present the plant is leafless. As the plant is described as a large floriferous shrub, the cultivated specimen perhaps represents a starved form.

149. **I. setifera,** *Poir. Encycl.* vi. 17. Perennial. Stem slender, twining or trailing, the younger portions clothed with long spreading bristly hairs. Leaves entire, glabrous, cordate to ovate-cordate, sub-acute or blunt, 3–5 in. long, with a deep or broad open basal sinus, rarely orbicular emarginate; petiole as long as the blade. Flowers solitary on short pedicels from the axils of the leaves or 2–3-nate on a long peduncle, with several large ovate foliaceous bracts at the base of the pedicels, which are 1–$1\frac{1}{2}$ in. long. Calyx glabrous, reaching 1 in. long; sepals ovate, apex obtuse, setiferous, back prominently longitudinally 5-veined and plicate, the two inner much smaller. Corolla funnel-shaped, bright red, $2\frac{3}{4}$–4 in. long. Seeds blackish, glabrous in African specimens (described by Choisy l.c. as tomentoso-puberulis).—Choisy in DC. Prodr. ix. 359; Hallier f. in Engl. Jahrb. xviii. 143. *I. teretistigma,* var. *setifera*, Choisy, l.c. ix. 373; Benth. in Hook. Niger Fl. 467. *I. Lesteri*, Baker in Kew Bulletin, 1892, 83.

Upper Guinea. Senegambia, *Heudelot*, 750! South bank of the Gambia River, *Brown-Lester*, 9! Sierra Leone, *Afzelius! Don! Scott-Elliot*, 5902!

Also in Tropical America.

150. **I. fimbriosepala,** *Choisy in DC. Prodr.* ix. 359. A herbaceous annual. Stem glabrous, twining. Leaves cordate-ovate, sub-acute, entire, glabrous, $1\frac{1}{2}$ in. long; petiole of the upper leaves generally shorter than the blade, of the lower as long as, or longer than, the blade. Peduncles very short, 1–2-flowered; pedicels longer

than the peduncles (6–8 lin. long) subtended by small ovate-acuminate shortly setiferous dorsally keeled bracts. Calyx glabrous, $\frac{1}{2}$ in. long; sepals ovate, acute, minutely setiferous, the outer larger and conspicuously nerved as in the preceding species; nerves 3; base cordate and fimbriate, as also are the nerves. Corolla about $1\frac{1}{2}$ in. long, rose-purple; the rather wide ($\frac{1}{4}$ in. in diam.) cylindrical tube expanding into the spreading funnel-shaped limb. Capsule globose, glabrous, shorter than the calyx. Seeds blackish, glabrous.—Hallier f. in Bull. Soc. Bot. Belg. xxxvii. 97. *I. Gilletii*, De Wild. & Durand in Bull. Herb. Boiss. 2 sér. i. 36. *I. phylloneura*, Baker in Journ. Linn. Soc. xxi. 426. *I. Smithii*, Baker in Kew Bulletin, 1894, 73. *Aniseia hastata*, Meissn. in Mart. Fl. Bras. vii. 319.

Lower Guinea. Lower Congo: by the Congo, *Smith!* Kisantu, *Gillet.*

Also in Madagascar, Pacific Islands, and Tropical America.

Excluded species.

151. **I. (Eriospermum) perringiana,** *Dammer in Engl. Jahrb.* xxiv. 460, *and in Gard. Chron.* 1897, xxii. 410.

Introduced from the Cameroons by Johannes Braun, and flowered in the Berlin Botanic Garden.

According to Hallier, who has examined a specimen in the Berlin Herbarium, this is a synonym of the widely spread South American species *I. bonariensis*, Hook. (= *I. Sellowii*, Penny), and not a native of West Africa. (See Hallier f. in Engl. Jahrb. xxviii. 50.)

27. **ARGYREIA,** Lour.; Benth. et Hook. f. Gen. Pl. ii. 869.

Calyx clasping the fruit, sometimes accrescent; sepals equal or the inner smaller. Corolla funnel-shaped to campanulate; limb obscurely lobed. Stamens included in the corolla-tube; filaments often dilated at the base; anthers linear-oblong. Disc annular, entire or 5-lobed. Ovary 2–4-celled, 4-ovuled; style filiform; stigma capitate, globose, emarginate. Fruit indehiscent, fleshy or finally dry, usually by abortion 1-seeded.—Stems usually scandent, rarely suberect. Leaves usually cordate-ovate and more or less silvery beneath. Cymes usually few-flowered, axillary, sometimes panicled; bracts small or subfoliaceous. Flowers large and showy.

Species about 40. The others are Indian and Malayan species.

Corolla 3–4 in. long.

Corolla campanulate with spreading mouth	1. *A. laxiflora.*
Corolla regularly funnel-shaped	2. *A. Grantii.*

Corolla less than 3 in. long.

Cymes few-flowered	3. *A. beraviensis.*
Cymes many-flowered	4. *A. multiflora.*

In the absence of fruit the generic determination of some of the species is doubtful.

1. **A. (?) laxiflora,** *Baker in Kew Bulletin,* 1894, 67. Stems woody, slender, scandent, terete, pubescent. Leaves cordate to cordate-

orbicular, 3½–7 in. long and broad, thin, glabrescent above, permanently densely pubescent beneath, becoming sparsely pubescent later; petiole about 3 in. long. Cymes very lax; peduncles and pedicels pubescent like the stem, nearly 1 in. long; bracts deciduous. Calyx ½ in. long, slightly pubescent; sepals suborbicular, subequal, much imbricate. Corolla 3–4 in. long, suddenly dilated just above the calyx, campanulate, with spreading mouth, 1 in. in diam. at the centre. Stamens unequal, the longest half the length of the corolla; anthers ¼ in. long. Fruit not seen.—*Stictocardia laxiflora*, Hallier f. in Bull. Herb. Boiss. vi. 548.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 388!

2. **A. (?) Grantii,** *Baker in Kew Bulletin*, 1894, 67. Rootstock globose, as large as a man's head. Stem suberect. Leaves elliptic-ovate, with retuse base, membranous, obtuse, 8 in. long, 6 in. broad, obscurely pilose beneath; petiole 2½ in. long. Peduncle much longer than the petiole, 4¾ in.; cymes dense, dichotomous, 4-flowered; pedicels short, densely pubescent, ⅓ in. long; bracts oblong, ¾ in. long, persistent, foliaceous, pubescent on back and margin. Calyx densely pubescent; outer sepals oblong to oblong-lanceolate, resembling the bracts, blunt; inner sepals up to ⅔ in. long, much shorter than the outer, ovate, subacute, pubescent along the middle line. Corolla regularly funnel-shaped, not lobed, delicate mauve-purple, about 3 in. long and about the same in diam. at the mouth. Stamens unequal, the longest above 1 in. long. Fruit not seen.—*A. populifolia*, var. *africana*, Oliver in Trans. Linn. Soc. xxix. 114. *Ipomœa populifolia*, Hallier f. in Engl. Jahrb. xxviii. 53.

Nile Land. Uganda: Chopeh (Unyoro) district, near Karuma Falls, *Speke & Grant*, 627!

The natives first propagate this plant in water, then plant it at the doors of their huts. A branch held in the hand is believed to insure success in hunting.—*Grant.*

3. **A. (?) beraviensis,** *Baker.* A woody climber with finely pubescent stems. Leaves distinctly petioled, cordate-ovate, acute, about 3 in. long and broad, thin, finely pubescent on both surfaces. Cymes few-flowered, sessile or shortly peduncled; bracts deciduous; pedicels short. Sepals orbicular to orbicular-oblong, obtuse, much imbricate, finely pubescent, ⅓–½ in. long. Corolla broadly funnel-shaped, bright violet, 2–2⅔ in. long; base of stamens densely hairy. Fruit not seen.—*Ipomœa beraviensis*, Vatke in Linnæa, xliii. 514. *Stictocardia beraviensis*, Hallier f. in Engl. Jahrb. xviii. 159, and in Bull. Soc. Bot. Belg. xxxvii. 102.

Upper Guinea. Gold Coast: Aquapim, *Johnson*, 789! Lagos, *Millen*, 55!

South Central. Congo Free State: Lomani River, *Pogge*, 1143; valley of the Buleschi, a tributary of the Luina River, *Descamps.*

Mozamb. Dist. German East Africa: Usukuma; Nyangusi, *Stuhlmann*, 4148.

4. **A. multiflora,** *Baker, not of Voigt.* A shrubby climber. Leaves distinctly petioled, large, cordate-ovate, acute, grey pubescent beneath and with glands barely visible to the naked eye. Peduncles short, axillary, many-flowered, glabrescent; pedicels as long as the peduncle, subclavate, barely 1 in. long. Sepals oblong-elliptic, obtuse, sometimes mucronate, grey pubescent on the back, margin glabrous, membranous. Corolla white, 2 in. long; midpetaline areas lined with 5 prominent nerves, glandular punctate, and with a tuft of white hairs at the end.—*Stictocardia multiflora*, Hallier f. in Engl. Jahrb. xviii. 160. *Rivea tiliæfolia*, var. *multiflora*, Klotzsch ex Hallier f. l.c.

Mozamb. Dist. Portuguese East Africa: Mozambique; Cabanira, *Peters.*

Not seen. A specimen from Brava, Somali Coast, collected by *Kirk* may perhaps be referable to this species. The leaves are multiglandular on the back, but glabrous, or sparsely puberulous on the veins. The sepals are oblong, the outer ones very broadly oblong, 7–7½ lin. long. The corolla is nearly 2½ in. long.

28. CUSCUTA, Linn.; Benth. et Hook. f. Gen. Pl. ii. 881.

Calyx usually campanulate; sepals usually 5, imbricate, ovate, generally more or less united at the base. Corolla campanulate; lobes usually 5, longer or shorter than the tube, imbricate; tube usually appendiculate with 5 scales, placed beneath the lobes. Stamens inserted in the sinuses between the corolla-lobes or below them; filaments filiform or flattened; anthers globose or oblong. Ovary 4-ovuled, perfectly or imperfectly 2-celled; styles 2, free to the base or connate; stigmas capitate or linear. Capsule dry or fleshy, bursting irregularly or dehiscence circumscissile. Seeds glabrous; embryo peripheric, filiform, entire.—Leafless parasites, with twining stems and small usually reddish-white flowers in clusters.

Species about 80. Cosmopolitan.

* EUCUSCUTA.—Styles free to the base or obsolete; stigmas narrow.

Styles developed.

Corolla-lobes narrow, acute . . . . 1. *C. abyssinica.*

Corolla-lobes ovate, obtuse to acute . . . 2. *C. planiflora.*

Styles obsolete . . . . . 3. *C. arabica.*

** GRAMMICA.—Styles free to the base; stigmas capitate.

Scales present on the corolla-tube.

Calyx 5-lobed to about the middle.

Capsule splitting irregularly at the base . 4. *C. chinensis.*

Capsule opening at the top . . . . 5. *C. obtusiflora.*

Calyx 5-partite nearly to the base . . . 6. *C. blepharolepis.*

Scales not present on the corolla-tube (small scales sometimes present in *C. Kilimanjari*).

Corolla-lobes obtuse . . . . . 7. *C. Kilimanjari.*

Corolla-lobes tapering, acute . . . . 8. *C. hyalina.*

Corolla-lobes acute . . . . . 9. *C. Epitribulum.*

*** MONOGYNA.—Styles connate.

10. *C. cassytoides.*

1. **C. abyssinica,** *Rich. Tent. Fl. Abyss.* ii. 78. Stem slender, branched. Heads sessile, dense, globose, many-flowered; flowers sessile. Calyx campanulate, 1 lin. long, 5-partite almost to the base; lobes ovate, acute. Corolla campanulate, scarcely longer than the calyx; lobes slightly exceeding the tube, narrowly triangular-ovate, very acute; scales broadly-oblong, fimbriate. Stamens slightly exserted, shorter than the corolla-lobes. Styles 2, shorter than the stigmas. Stigmas slender, included, together with the styles about $\frac{1}{2}$ in. long. Capsule circumscissile; seeds brown, testa rough.—Engelm. in Trans. Acad. Sci. St. Louis, i. 464. *C. hyalina*, Vatke in Linnæa, xliii. 525, and Engl. Hochgebirgsfl. Trop. Afr. 351 not of Roth.

Nile Land. Eritrea: Habab, *Hildebrandt*, 506! Abyssinia: by the Tacazze River, *Quartin-Dillon*. Somaliland; Serut Mountains, near Maid, 5000–7500 ft., *Hildebrandt*, 1413! Wagga Mountain, 6000 ft., *Mrs. Lort Phillips!*

I have seen no authenticated specimen of this species, and the determinations are made with some reserve. The species is very near *C. planiflora*, differing only in the longer, more acute corolla-lobes.—*A. B. R.*

2. **C. planiflora,** *Ten. Fl. Nap.* iii. 250. Stems very slender, reddish. Flowers sessile or subsessile, in dense globose sessile clusters, 2–3 lin. in diam. Calyx broadly cup-shaped, about 1 lin. long; lobes 5, ovate, obtuse to subacute, about as long as the tube. Corolla slightly exceeding the calyx, globose-urceolate; lobes 5, ovate, obtuse, pale pink or whitish, spreading, barely as long as the tube; scales broad, shortly fimbriate above. Stamens 5, shorter than the lobes. Styles shorter than the linear stigmas; style and stigma together barely $\frac{1}{2}$ lin. long. Capsule regularly circumscissile at the base. Seeds 4, brown; testa granulate.—Engelm. in Trans. Acad. Sci. St. Louis, i. 464. *C. brevistyla*, A. Braun ex A. Rich. Tent. Fl. Abyss. ii. 79; Engelm. l.c. 467; Engl. Hochgebirgsfl. Trop. Afr. 350.

Nile Land. Nubia: Coast to between 3000 and 4000 ft., *Bent!* Eritrea: Asmara, 7500 ft., *Schweinfurth & Riva*, 2092! Abyssinia: Mountains near Axum, *Schimper*, 1486! Asfaha, 7000 and 8000 ft., *Schimper*, 743! Sanka Berr, 7000 ft., *Schimper*, 1120! Doka Keit, *Roth*, 426! Messraha near Lake Zana, 7500 ft., *Schimper* 1344! and without precise locality, *Schimper*, 14!

Also in the Mediterranean region, India, and Central Asia.

Var. *Holstii*, Rendle. Sepals free nearly to the base, ovate, obtuse, much imbricate, 1 lin. long. Corolla slightly exceeding the calyx; lobes triangular-ovate, more or less acute; scales suborbicular with shortly fimbriate edge. Styles short; stigmas linear, nearly 1 lin. long.

Mozamb Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 9114!

Var. *mossamedensis*, Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 743. Calyx fleshy 4-lobed, less than 1 lin. long; lobes broadly ovate, obtuse. Corolla about as long as the calyx, 4-lobed; lobes triangular, subacute; stamens 4. Styles very short; stigmas linear, about as long as the ovary.

Lower Guinea. Angola: Mossamedes; between Cazimba and Mossamedes, in gravelly submaritime stations flooded in the rainy season; parasitic on *Merremia multisecta*. *Welwitsch*, 6121!

3. **C. arabica,** *Fres. in Mus. Senckenb.* i. 165. Stem filiform. Flower-clusters small, about 2 lin. in diam.; flowers subsessile. Calyx shallowly campanulate, 5-lobed to about the middle, about $\frac{2}{3}$ lin. long. Corolla shortly campanulate, slightly exceeding the calyx; lobes short, bluntly ovate. Stamens a little shorter than the corolla-lobes. Scales bluntly ovate-oblong, fimbriate. Styles obsolete; stigmas short, linear, Capsule ultimately separating at the base. Seeds pale brown, granulate. —Choisy in DC. Prodr. ix. 453; A. Rich. Tent. Fl. Abyss. ii. 78; Engelm. in Trans. Acad. Sci. St. Louis, i. 472; Capua in Ann. Istit. Bot. Roma, viii. 233.

Nile Land. Eritrea: Assaorta, *Pappi*, 3451; Mensa, *Terracciano & Pappi*, 960, 1345; Amasen, *Terracciano & Pappi*, 2411; Bogos, *Terracciano & Pappi*, 2485. Abyssinia: Wojerat, *Petit*.

4. **C. chinensis,** *Lam. Encycl.* ii. 229. Stems slender, deep crimson. Flower clusters dense, 4–5 lin. broad in the African specimen. Flowers shortly stalked; bracts fleshy, bluntly ovate, about 1 in. long. Calyx a little over 1 lin. long, 5-lobed to below the middle; lobes elliptic-ovate, obtuse. Corolla $1\frac{1}{2}$ lin. long, subglobose; lobes reflexed slightly shorter than the tube, ovate-triangular, blunt. Scales broad, fimbriate. Stamens with flat filaments a little shorter than the corolla-lobes. Capsules unripe in African specimens; apparently not circumscissile.—Choisy in DC. Prodr. ix. 457; Wight, Ic. t. 1373; Engelm. in Trans. Acad. Sci. St. Louis, i. 479; Clarke in Hook. f. Fl. Brit. Ind. iv. 226.

Upper Guinea. Gold Coast: Aburi, *Johnson*, 157!
Also in Socotra and Madagascar, Tropical Asia, China and Australia.

5. **C. obtusiflora,** var. **cordofana,** *Engelm. in Trans. Acad. Sci. St. Louis*, i. 493. Stems stout for the genus, bright yellow. Flowers few in a cluster, more or less glandular, sessile or shortly stalked, subtended by a persistent bluntly ovate somewhat fleshy bract about 1 lin. long. Calyx fleshy, broadly cup-shaped, $1\frac{1}{2}$ lin. long, lobed to about or a little below the middle; lobes semiorbicular, blunt. Corolla shortly campanulate, about $2\frac{1}{2}$ lin. long; lobes bluntly ovate, obtuse, shorter than the tube. Stamens included; filaments flat; scales small, generally shortly bifid, fimbriate, Styles 2, cylindrical, less than $\frac{1}{2}$ lin. long; stigmas capitate. Capsule depressed-globose, $\frac{1}{4}$ in. in diam., umbilicate, 4-seeded.—Dammer in Engl. Pfl. Ost-Afr. C. 334.

Nile Land. Kordofan, *Figari*. Uganda: Mau, 8000 ft., *Scott-Elliot*, 6904! Nandi forest, *Johnston!* second day's march from Eldama Ravine, 7000–8000 ft., *Whyte!* British East Africa: Kikuyu, 5000–6000 ft., *Scott-Elliot*, 6591!

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 8909! Moshi, 4000–5500 ft., *Taylor!* Marangu on Kilimanjaro, and Bukoba in Karagwe, ex *Dammer*. Portuguese East Africa: Quilimane, ex *Dammer*. British Central Africa: Nyasaland; Mount Chiradzulu, *Whyte!*

Var. *eritræana*, Rendle. Stems filiform. Flowers few in a cluster, subsessile, eglandular; bracts concave, bluntly ovate, strongly keeled, about 1 lin. long. Calyx $1\frac{1}{4}$ lin. long, shortly campanulate; lobes 5, shorter than the tube, very

obtuse, unequal ; sepals keeled. Corolla barely exceeding the calyx, with globose tube and strongly reflexed, short, bluntly ovate lobes. Stamens nearly as long as the lobes.

Nile Land. Eritrea: Mount Gheden, near Massaua, 500–1000 ft., *Schweinfurth & Riva*, 94 !

The species is widely distributed with numerous varieties in both Old and New Worlds. The brief description of *C. ndorensis*, Schweinf. (in von Hohnel's Pl. Rudolph See, 859), gathered by von Hohnel at 6000 ft. alt. in Ndoro, gives no character by which it can be distinguished from *C. obtusiflora*.

6. **C. blepharolepis,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 743. A fleshy herb, with deep orange or saffron-coloured stems. Flowers sessile or subsessile, forming lateral clusters, 3–4 lin. in diam., distant or approximated in larger clusters; bracts round-ovate, blunt, apiculate, about $1\frac{1}{2}$ lin. long. Calyx and corolla 5-merous, pale yellowish. Calyx hemispherical, about $1\frac{1}{2}$ lin. in diam. Sepals free to the base, closely imbricate, fleshy, orbicular-ovate, barely $1\frac{1}{2}$ lin. long, obtuse, dorsally thickened in the middle line and beneath the apex, margin erosulose. Corolla exceeding the calyx; tube shortly campanulate, about 1 lin. long; lobes spreading ovate, blunt, $1\frac{1}{3}$ lin. long, margin erosulose. Scales large, broadly oblong, fimbriate, embracing the styles and thus closing the throat of the corolla. Anthers yellow, exserted; connective slightly produced at the tip. Ovary 2-celled, 4-ovuled; styles 2, long (ultimately $1\frac{1}{3}$ lin. long), exserted; stigmas capitate. Fruit not present.

Lower Guinea. Angola: Pungo Andongo ; near Pedra Cabondo, *Welwitsch*, 6140 !

7. **C. Kilimanjari,** *Oliver in Trans. Linn. Soc. 2 ser. Bot.* ii. 343. Stems dark-coloured when dry, shorter than in *C. hyalina*. Flowers in umbellate clusters subtended by a broadly ovate carinate blunt bract barely $1\frac{1}{2}$ lin. long, shortly pedicellate. Calyx broadly campanulate, 1 lin. or a little over 1 lin. long; lobes broadly ovate, obtuse, 5-partite nearly to the base, closely imbricate. Corolla yellowish-white, broadly campanulate, $1\frac{1}{2}$ lin. long, without any scales but foveolate opposite the lobes, or small blunt scales sometimes present; lobes very broadly ovate, obtuse, as long as the tube. Stamens short, inserted in the sinuses; filaments flattened. Styles subulate, shorter than the ovary; stigma capitate. Capsule probably circumscissile near the base.—Engl. Hochgebirgsfl. Trop. Afr. 351.

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Johnston*, 86 !

8. **C. hyalina,** *Roth, Nov. Pl. Spec.* 100. Stems very slender. Flowers stalked, in few (often 3-) flowered monochasial cymes; pedicels 1–2 lin. long; bract ovate, acute, about $1\frac{1}{2}$ lin. long. Calyx barely $1\frac{1}{2}$ lin. long; lobes ovate, acute, twice as long as the campanulate tube. Corolla-tube campanulate, $1\frac{1}{2}$ lin. long, without any scales; segments narrowly ovate-triangular, tapering, spreading. Stamens much shorter than the corolla-lobes; filaments rather flattened; anthers oblong. Styles long, slender, extended to $\frac{3}{4}$ lin. long ; stigma globose, capitate.

Capsule fragile, bursting irregularly at the base ; seeds pale brown, testa granulate.—Choisy in DC. Prodr. ix. 460 ; Engelm. in Trans. Acad. Sci. St. Louis, i. 490 ; Dammer in Engl. Pfl. Ost-Afr. C. 334 ; Vatke in Linnæa, xliii. 525 ; Capua in Ann. Istit. Bot. Roma, viii. 234. *C. arabica*, Wight, Ic. t. 1371 ; Schweinf. in Pl. Nub. Exsic. No. 964, not of Fresen.

Nile Land. Nubia : Gef, near Suakim, *Schweinfurth*, 964 ! Kordofan, *Pfund*, 146 ! Eritrea : Ocule Cusai, *Pappe*, 4006. Abyssinia, *Schimper*, 1522. Uganda : near Lake Baringo, *Johnston !*

Mozamb. Dist. Lake region, ex *Dammer*.

Also in Tropical Asia.

9. **C. Epitribulum,** *Schinz in Bull. Herb. Boiss. 2 sér.* i. 880. Parasitic on species of *Tribulus*. Flowers in loose clusters. Calyx broadly funnel-shaped [1½ lin. long] ; lobes broadly lanceolate [or triangular-ovate], acute, erect. Corolla a little longer than the calyx ; lobes elongated, lanceolate above [narrowly triangular-ovate], acute ; scales absent. Stamens shorter than the corolla-lobes. Styles exserted, unequal. Stigmas capitate. Capsule irregularly circumscissile ; seeds 4, brown, testa granulate.

Lower Guinea. German South-west Africa : Hereroland ; Okomita, *Dinter*, 506.

Mozamb. Dist, British Central Africa : Ngamiland ; Koobie (Kobis) to North Shaw Valley, parasitic on *Tribulus, Baines !*

I have not seen an authenticated specimen of this species. The plant collected by Baines is in advanced fruit : the portions included in brackets in the above description refer to it. The species is very near *C. hyalina*, but has less sharply acute lobes to the calyx and corolla.

10. **C. cassytoides,** *Nees in Linnæa*, xx. 196 (*name only*). Stems as stout as whipcord. Flowers sessile or nearly sessile, in laxly spicate sessile 1– to few-flowered cymes, each subtended by a persistent orbicular bract. Calyx fleshy, campanulate, barely 1 lin. long ; tube very short ; lobes orbicular, imbricate. Corolla 1½–1¾ lin. long ; lobes oblong, obtuse, shorter than the campanulate tube. Anthers sessile at the throat of the corolla-tube ; scales triangular with erosulose margin. Style 1 ; stigma 2-lobed. Capsule indehiscent, ovoid in the tropical African specimen, but unripe.—Engelm. in Trans. Acad. Sci. St. Louis, i. 513 ; Dammer in Engl. Pfl. Ost-Afr. C. 334 ; Baker & Wright in Dyer, Fl. Cap. iv. ii. 86.

Mozamb. Dist. German East Africa : Usambara ; Kwa Mshuza, 4500–5000 ft., *Holst*, 9062 !

Also in South Africa.

ORDER XCI. **SOLANACEÆ.** (By C. H. Wright.)

Flowers usually hermaphrodite, regular or slightly irregular. Calyx 4–5- (rarely 6–7-) toothed or lobed; lobes imbricate or valvate. Corolla campanulate, rotate, funnel-shaped or tubular, sometimes plicate; lobes 4–5 (rarely 6–7), induplicate-valvate or imbricate in bud, patent or more rarely erect. Stamens as many as the corolla-lobes, rarely fewer, inserted in the corolla-tube; filaments short or long; anthers distinct or conniving in a cone, cells parallel or diverging, dehiscing by terminal or oblique pores or longitudinal slits. Disk annular, entire or lobed or absent. Ovary superior, sessile or shortly stipitate, 2–5-celled; style terminal, filiform or clavate; stigma terminal, small or slightly expanded or bilamellate; ovules numerous, anatropous or amphitropous. Fruit an indehiscent berry, or a capsule dehiscing by valves or circumscissile. Seeds numerous, small; albumen fleshy; embryo often terete, near the outside of the albumen; cotyledons semiterete, rarely wider than the radicle.—Herbs, erect or climbing shrubs, more rarely trees, glabrous, pubescent or stellately tomentose, sometimes spiny. Leaves alternate, geminate or verticillate, entire or variously lobed. Inflorescence cymose, terminal, leaf-opposed or extra-axillary, sometimes appearing umbellate, racemose or fasciculate, or reduced to one flower.

Species about 1400, absent only from arctic and alpine regions, very abundant in tropical and extra-tropical South America.

Fruit baccate.
- Anthers usually dehiscing by pores . . . . 1. SOLANUM.
- Anthers dehiscing by longitudinal slits.
  - Calyx much enlarged in fruit.
    - Flowers solitary . . . . . 2. PHYSALIS.
    - Flowers fascicled . . . . . 3. WITHANIA.
  - Calyx not or slightly enlarged in fruit.
    - Corolla subrotate, valvate . . . . 4. CAPSICUM.
    - Corolla urceolate, induplicate-valvate . . 5. DISCOPODIUM.
    - Corolla tubular or funnel-shaped, imbricate . 6. LYCIUM.
    - Corolla salver-shaped, induplicate-valvate . . 7. CESTRUM.

Fruit capsular.
- Capsule 4-valved . . . . . 8. DATURA.
- Capsule circumscissile . . . . . 9. HYOSCYAMUS.
- Capsule 2-valved.
  - Stamens 5 . . . . . 10. NICOTIANA.
  - Stamens 2 . . . . . 11. SCHWENKIA.

1. **SOLANUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 888.

Calyx campanulate, rotate or cupular, 4–5-toothed or -lobed, sometimes slightly enlarged in fruit. Corolla rotate or widely campanulate; limb plicate, or more or less deeply 4–5-lobed and induplicate-valvate. Stamens 4–5, inserted in the corolla-throat; filaments very short;

anthers oblong or lanceolate, conniving or cohering in a cone, dehiscing by pores, rarely by longitudinal slits. Ovary 2-(rarely 3–4-)celled; style simple; stigma usually small; ovules numerous. Berry usually globose, sometimes oblong. Seeds compressed, orbicular or subreniform; testa often minutely pitted; embryo much curved near the margin; cotyledons semiterete.—Herbs, shrubs or small trees, sometimes climbing, unarmed or spiny. Leaves alternate or geminate, entire, lobed or pinnatisect. Cymes extra-axillary, dichotomous, racemose or umbellate, sometimes arranged in a terminal panicle. Flowers yellow, white, violet or purple.

Species about 800, most abundant within the tropics, but extending into the temperate zone.

S. cornigerum, André in Rev. Hort. 1868, 33, is a native of the Shan Hills, Burma, and not of Tropical Africa as was suggested in the original description. *S. insigne*, Lowe, has been cultivated in Mossamedes (Hiern in Cat. Afr. Pl. Welw. i. 749).

* INERMES.—Plants without spines (except occasionally in *S. panduræforme*).

† Flowers in terminal or pseudoterminal panicles (See also *S. verbascifolium*).

Filaments united . . . . . 1. *S. inconstans.*

Filaments free.

Leaves densely stellate tomentose below . 2. *S. runsoriense.*

Leaves stellately hairy on both surfaces.

Branches ashy-white . . . . 3. *S. tettense.*

Branches violet . . . . . 4. *S. somalense.*

Leaves glabrous or nearly so.

Panicle diffuse . . . . . 5. *S. bendirianum.*

Panicle compact.

Lowest cluster of flowers on peduncles 6–12 lin. long . . . . 6. *S. bifurcum.*

Lowest cluster of flowers subsessile . 7. *S. Welwitschii.*

†† Flowers not in terminal panicles.

‡ Corolla at least 9 lin. in diam.

Leaves glabrous.

Calyx-lobes linear . . . . 8. *S. aggregatum.*

Calyx-lobes foliaceous . . . . 9. *S. macrocarpon.*

Leaves stellately hairy.

Leaves entire or slightly sinuate, oblong-lanceolate.

Leaves pubescent.

Corolla 12 lin. in diam. . . 10. *S. panduræforme.*

Corolla 9 lin. in diam. . . 11. *S. psilostylum.*

Leaves scabrid . . . . 12. *S. benguelense.*

Leaves slightly sinuate, ovate-lanceolate. 13. *S. Volkensii.*

Leaves distinctly sinuate, oblong.

Flowers solitary or in pairs . . 14. *S. Naumanni.*

Flowers in racemose cymes . . 15. *S. Monteiroi.*

Leaves sinuate, ovate-cordate . . 16. *S. Stuhlmannii.*

Leaves pinnately lobed.

Leaves with stellate and simple hairs beneath . . . . . 17. *S. Thomsoni.*

Leaves with only stellate hairs beneath 90. *S. Melongena*, var. *inerme.*

‡‡ Corolla less than 9 lin. in diam.
Leaves glabrous or nearly so when mature.
Leaves more or less sinuate . . 18. *S. æthiopicum.*
Leaves entire.
Cymes nearly sessile, corymbose . 19. *S. pauperum.*
Cymes peduncled, racemose . . 20. *S. Gætzei.*
Cymes peduncled, subumbellate.
Corolla 4–5 lin. in diam.
Herbaceous . . . . 21. *S. nodiflorum.*
Shrubby . . . . 23. *S. nakurense.*
Corolla 9 lin. in diam . . . 24. *S. carense.*
Leaves with simple hairs.
Leaves more or less lobed . . 22. *S. nigrum.*
Leaves entire.
Herbaceous . - . . 25. *S. hirtulum.*
Suffruticose.
Pedicels filiform . . . 26. *S. campanuliflorum.*
Pedicels clavate.
Corolla-lobes obtuse; stem terete . . . . 27. *S. lykipiense.*
Corolla-lobes acute; stem 4-angled . . . 28. *S. pseudospinosum.*
Leaves with stellate hairs.
Cymes dichotomous.
Leaves glabrescent above . . 29. *S. subulatum.*
Leaves permanently hairy above . 30. *S. verbascifolium.*
Cymes not dichotomous.
Leaves entire.
Flowers 4-merous.
Leaves ovate, acute . . 31. *S. schimperianum*
Leaves ovate-lanceolate, acuminate . . . 32. *S. senegambicum.*
Flowers 5-merous.
Cymes umbellate. . . 33. *S. polyanthemum.*
Cymes corymbose . . 34. *S. catombelense.*
Cymes racemose.
Leaves solitary . . 35. *S. mossambicense.*
Leaves geminate.
Corolla rotate.
Flowers 8–12 . . 36. *S. distichum.*
Flowers 3–5 . . 37. *S. Reichenbachii.*
Corolla campanulate . 38. *S. geminifolium.*
Leaves sinuate or lobed.
Leaves white beneath; lowest flower alone fertile . . 39. *S. albifolium.*
Leaves green beneath; many flowers fertile . . . 40. *S. scalare.*

** ARMATÆ.—Plants bearing spines. (See also 10, *S. panduræforme.*)

† *Microphyllæ.*—Leaves rarely more than 1½ in. long.
Flowers in peduncled cymes.
Corolla-lobes oblong . . . . . 41. *S. Heudelotii.*
Corolla-lobes ovate or ovate-lanceolate . 42. *S. macracanthum.*
Corolla-lobes linear.

Branches white-tomentose . . . 43. *S. albicaule.*
Branches glabrous . . . . 44. *S. kwebense.*
Corolla-lobes broadly triangular . . 45. *S. melastomoides.*
Flowers solitary or fasciculate.
Spines recurved.
Leaves stellately hairy.
Leaves hastate . . . . . 46. *S. hastifolium.*
Leaves ovate or lanceolate-linear . 47. *S. taitense.*
Leaves glabrous . . . . . 48. *S. sepicula.*
Spines straight, nearly setaceous.
Leaves densely stellate-hairy . . 49. *S. stipitato-stellatum.*
Leaves almost glabrescent . . . 50. *S. rigescens.*
Spines straight, thick.
Pedicels long, slender . . . . 51. *S. gracilipes.*
Pedicels short, thick . . . . 52. *S. piperiferum.*

†† *Macrophyllæ.*—Leaves much exceeding 1½ in. in length.

‡ *Parvifloræ.*—Corolla not exceeding 9 lin. in. diam.
Fruit 1 in. or more in diam. . . . 53. *S. aculeatissimum.*
Fruit not exceeding 6 lin. in diam.
Cymes pseudo-terminal, corymbose.
Leaves 4–7 in. long . . . . 54. *S. giganteum.*
Leaves 2–3 in. long . . . . 55. *S. Renschii.*
Cymes lateral.
Spines recurved.
Flowers 4-merous . . . . 56. *S. vagans.*
Flowers 5-merous.
Cymes umbellate . . . . 57. *S. zanzibarense.*
Cymes racemose.
Corolla-lobes triangular-ovate . 58. *S. pharmacum.*
Corolla-lobes linear-lanceolate . 59. *S. glochidiatum.*
Corolla-lobes lanceolate . . 60. *S. unguiculatum.*
Spines straight.
Cymes corymbose.
Flowers 4-merous . . . . 61. *S. Rohrii.*
Flowers 5-merous . . . . 62. *S. torvum.*
Cymes racemose.
Hairs on leaf unequal-rayed . . 63. *S. indicum.*
Hairs on leaf equal-rayed.
Flowers 4-merous . . . 64. *S. anomalum.*
Flowers 5-merous.
Corolla-lobes lanceolate . . 65. *S. adoënse.*
Corolla-lobes linear . . 66. *S. Carvalhoi.*
Cymes umbellate . . . . 67. *S. schumannianum.*

‡‡ *Grandifloræ.*—Corolla more than 9 lin. in diam.
Leaves membranous. Inflorescence cymose, lax.
Leaves becoming nearly glabrous above . 68. *S. xanthocarpum.*
Leaves with scattered stellate hairs above.
Spines straight . . . . . 69. *S. Thruppii.*
Spines recurved . . . . . 70. *S. acanthocalyx.*
Leaves coriaceous, becoming glabrous above except near the pulverulent margins . 71. *S. marginatum.*
Leaves entire or slightly lobed.

Fruit small, nearly enclosed in the spiny calyx.
  Inflorescence cymose . . . . 72. *S. dubium.*
  Inflorescence racemose . . . 73. *S. Fischeri.*
Fruit small, not enclosed in the calyx.
  Flowers 5-merous . . . . 74. *S. obliquum.*
  Flowers 6-merous . . . . 75. *S. urbanianum.*
Fruit usually large, not enclosed in the calyx.
  Leaves oblong . . . . . 76. *S. tomentellum.*
  Leaves lanceolate.
    Indumentum beneath leaves ashy-grey . . . . . 77. *S. trepidans.*
    Indumentum of leaves rusty.
      Leaves pubescent above . . 10. *S. panduræforme.*
      Leaves scabrid above . . 78. *S. englerianum.*
Leaves more or less ovate in general outline.
  Tomentum on stem floccose.
    Tomentum ashy-grey . . . 79. *S. incanum.*
    Tomentum rusty . . . 80. *S. chrysotrichum.*
  Tomentum on stem not floccose.
    Leaves usually entire.
      Spines curved . . . 81. *S. campylacanthum.*
      Spines straight . . . 82. *S. phoricum.*
    Leaves lobed.
      Spines distinctly recurved.
        Calyx-lobes lanceolate.
          Corolla-lobes lanceolate . 83. *S. magnusianum.*
          Corolla-lobes ovate . . 84. *S. bathocladon.*
          Corolla-lobes ovate-cuneate 85. *S. Bojeri.*
        Calyx-lobes subulate . . 86. *S. monotanthum.*
      Spines straight or nearly so.
        Fruit subglobose.
          Corolla-lobes broadly triangular . . . 87. *S. hybridum.*
          Corolla-lobes lanceolate . 88. *S. cerasiferum.*
          Corolla-lobes oblong-oval . 89. *S. antidotum.*
        Fruit oblong.
          Corolla campanulate . 90. *S. Melongena.*
          Corolla rotate . . 91. *S. kitivuense.*
Leaves deeply pinnately lobed, lower surface much paler than the upper . . . 92. *S. aculeastrum.*
Leaves bipinnatipartite.
  Corolla broadly campanulate . . 93. *S. duplosinuatum.*
  Corolla rotate . . . . 94. *S. dasyphyllum.*

1. **S. inconstans,** *C. H. Wright in Kew Bulletin*, 1894, 127. A climbing shrub. Stem slender, terete, smooth, 10 ft. long. Leaves alternate or geminate, oblong, acute or acuminate, cordate or acute at the base, up to 5 in. long and 3 in. wide, sparingly hairy on both surfaces, hairs simple; petiole slender, up to 1 in. long, puberulous. Panicle pseudo-terminal, lax, formed of peduncled or sessile cymes racemosely arranged; pedicels short, velvety. Calyx cupular, velvety,

shortly 5-toothed. Corolla violet; tube very short; lobes 5, lanceolate, 4 lin. long. Stamens 5; filaments short, united into a tube; anthers united, 3 lin. long, obtuse, pores small, terminal. Ovary ovoid, glabrous; style filiform, much longer than the stamens. Fruit ovoid. —*S. symphystemon*, De Wild. & Durand, Contrib. Fl. Congo, i. 44; Ill. Fl. Congo, i. t. 57; Pl. Thonner. Congol. 34, t. 22.

Upper Guinea. Cameroons, *Kalbreyer*, 172! Fernando Po, *Mann*, 62!

South Central. Congo Free State: Bolombo, near Ngali, *Thonner*, 96!

A re-examination of Kalbreyer's plant shows that the filaments are permanently united.

2. **S. runsoriense,** *C. H. Wright in Johnston, Uganda Protect.* i. 326. A climbing shrub. Leaves lanceolate, rounded at the base, $3\frac{1}{2}$ in. long, 1–$1\frac{1}{4}$ in. wide, with scattered deciduous simple hairs above and densely packed brownish stellate ones beneath; petiole $\frac{3}{4}$ in. long. Inflorescence terminal, corymbosely paniculate, clothed in most of its parts with stalked stellate hairs; pedicels $\frac{1}{2}$ in. long. Calyx turbinate; lobes oblong, subacute, $\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 1 lin. wide. Corolla "smalt blue" (*Johnston*), subregular; tube campanulate, $\frac{1}{4}$ in. long; lobes lanceolate to ovate, acuminate, glabrous inside, 5 lin. long, 2–3 lin. wide. Stamens exserted; filaments compressed, pubescent, $1\frac{1}{2}$ lin. long; anthers oblong, obtuse, longer than the filaments. Ovary globose, $\frac{3}{4}$ lin. in diam., glabrous; style cylindrical, glabrous, $2\frac{1}{2}$ lin. long.

Nile Land. Uganda: Ruwenzori, 8500–9400 ft., *Doggett!*

3. **S. tettense,** *Klotzsch in Peters, Reise Mossamb. Bot.* 237. A much-branched unarmed shrub. Branches terete, subglabrous, ashy-white. Leaves ovate, acute or obtuse, 1–$1\frac{1}{2}$ in. long, 6–8 lin. broad, stellately hairy on both surfaces; petiole 3–4 lin. long. Racemes terminal, many-flowered; rhachis clothed with white stellate tomentum. Calyx cyathiform, shortly 5-fid, stellately pubescent. Corolla 5-partite; segments oblong or ovate, 4 lin. long. Stamens as long as the corolla; filaments very short; anthers oblong. Style glabrous, exserted; stigma bilobed.

Mozamb. Dist. Portuguese East Africa; Tete, *Peters*.

4. **S. somalense,** *Franch. Sert. Somal.* 47. An unarmed much-branched shrub. Branches covered with stellate tomentum when young, glabrous and violet when old. Leaves oblong or obovate, shortly attenuate at the base, stellately hairy on both surfaces, petioled. Cymes terminal, corymbose. Calyx divided half-way down into 5 linear-lanceolate lobes. Corolla widely campanulate, violet. Stamens unequal. Style elongate, arcuate, declinate.

Nile Land. Somaliland: Warabot, *Ritter von Beck;* and without precise locality, *Révoil*.

5. **S. bendirianum,** *Schimp. ex Engl. in Engl. Hochgebirgsfl. Trop. Afr.* 372. A climbing shrub. Branches terete, glabrous, straw-coloured. Leaves ovate, slightly tapering towards the base, $3\frac{1}{2}$ in. long, 2 in. wide, pale green, minutely scabrid; petiole 1 in. long, slightly winged. Cymes corymbose, terminal, lax, many-flowered; pedicels

thickened upwards. Calyx campanulate, deeply 5-lobed, ciliate. Corolla rotate, $\frac{2}{3}$ in. in diam.; lobes 5, triangular, obtuse, pubescent outside at the apex. Anthers shorter than the corolla-lobes, oblong, obtuse, dehiscing by large oblique pores. Ovary globose, glabrous; style slightly longer than the stamens. Berry globose, 5 lin. in diam., glabrous.

Nile Land. Abyssinia: Begemeder; near Gafat, *Schimper*, 1227! Hawash and Maki Rivers, *Wellby!* Uganda: Ruwenzori; Kivatu, in forest, 8000-9000 ft., *Scott-Elliot*, 7733!

6. **S. bifurcum,** *Hochst. in Flora*, 1841, i. *Intell.* 24. Stem sarmentose, glabrous. Leaves ovate or ovate-lanceolate, acute, sparingly pilose or glabrous, membranous, pale green, shortly petiolate. Inflorescence terminal, many-flowered; umbels racemosely disposed; pedicels up to 1 in. long in fruit, thickened upwards. Calyx cup-shaped, 5-fid, more or less glandular. Corolla 5-partite; lobes oblong, acute, 3–4 times as long as the calyx, tomentose outside, glabrous within. Stamens 5; anthers yellow, dehiscing by apical pores which are much prolonged downwards. Ovary globose, glabrous; style nearly twice as long as the stamens; stigma punctate. Berry small, globose.—Dunal in DC. Prodr. xiii. i. 77; Engl. Glied. Veg. Usambara, 61, and Pfl. Ost-Afr. C. 352; Hiern in Cat. Afr. Pl. Welw. i. 746; C. H. Wright in Dyer, Fl. Cap. iv. ii. 94. *S. bifurcatum*, A. Rich. Tent. Fl. Abyss. ii. 98. *S. phytolaccoides*, C. H. Wright in Kew Bulletin, 1894, 126.

Nile Land. Abyssinia: near Adowa, *Schimper*, 201! Begemeder, *Schimper*, 310! Uganda: Entebbe, 3900 ft., *Brown*, 14! British East Africa: Galunka, *Käsmer*, 804!

Lower Guinea. Island of St. Thomas, *Mann!* Angola: Pungo Andongo, 2400–3800 ft., *Welwitsch*, 6106! 6107!

Mozamb. Dist. German East Africa: Kilimanjaro, 5000 ft., *Johnston!* Usambara, Kwa-Mshuza, *Holst*, 8927! Portuguese East Africa: Moramballa, 3000 ft., *Kirk!*

Also in South Africa.

7. **S. Welwitschii,** *C. H. Wright in Kew Bulletin*, 1894, 126. A climbing shrub, 12–15 ft. high. Stem terete, smooth. Leaves oblong, more or less acuminate, 5 in. long, $2\frac{1}{2}$ in. wide, glabrous; petiole slender, 6–9 lin. long. Flowers in a terminal racemose panicle. Calyx cupular, 5-toothed. Corolla deep violet (*Welwitsch*)), 3–4 times as long as the calyx, divided nearly to the base; lobes 5, ligulate, concave, pubescent outside. Stamens 5; filaments very short; anthers oblong, connivent, pores terminal. Ovary globose; style filiform, nearly twice as long as the stamens. Fruit not seen.—Hiern in Cat. Afr. Pl. Welw. i. 747.

Lower Guinea. Angola: Cazengo; elevated forests on the Muxaulo Mountains, *Welwitsch*, 6081! 6098!

Var. *strictum*, C. H. Wright, l.c. 127. Flowers arranged in elongated subracemose cymes.—Cummins in Kew Bulletin, 1898, 77. *S. Lujæi*, De Wild. Dur. in Comptes-rendus Soc. Bot. Belg. xxxviii. 209.

Upper Guinea. Gold Coast: Sutah, *Cummins*, 45! Aburi, *Johnson*, 158! Akim, *Johnson*, 268! Fernando Po, *Mann*, 274!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth*, 3498! Sona Gunga, *Luja*, ex *De Wildeman & Durand*.

Var. *oblongum*, C. H. Wright, l.c. 127. Leaves narrower, more obtuse and tapering more to the base.

Upper Guinea. Cameroons: Ambas Bay, *Mann*, X!

The corolla-lobes remaining adherent for some time gave rise to the corolla being erroneously described as urceolate.

8. **S. aggregatum,** *Jacq. Coll.* iv. 124. An erect unarmed shrub, 4 ft. high. Branches terete, rigid, minutely puberulous, lenticellate. Leaves aggregate, ovate to oblong, obtuse, up to 2 in. long by 14 lin. wide, entire or slightly repand, long cuneate at the base, glabrous; midrib prominent; petiole up to $\frac{3}{4}$ in. long. Flowers solitary or 2–3 together; pedicels slender, up to 1 in. long, cernuous in fruit. Calyx campanulate, $\frac{1}{4}$ in. long; lobes linear, obtuse, as long as the tube, 1-nerved. Corolla widely campanulate, $\frac{3}{4}$ in. in diam., 5-partite; lobes oblong, slightly undulate, rather acute, pubescent outside the apex. Stamens 5; filaments $\frac{1}{2}$ lin. long, white; anthers oblong, yellow, 2 lin. long, pores terminal. Style white, 4–5 lin. long; stigma small. Fruit subglobose, yellow, as large as a pea; seeds few, compressed.—Ic. t. 323; Drège in Linnæa, xx. 203; Dunal in DC. Prodr. xiii. i. 160; C. H. Wright in Dyer, Fl. Cap. iv. ii. 91. *S. monticolum*, Dunal, l.c. 161. *Lycium sp.*, Drège, Zwei Pflanzengeogr. Documente, 75, 88. *Atropa solanacea*, Linn. Mant. Alt. 205; Thunb. Prodr. 37, and Fl. Cap. ed. Schult. 191.

Guinea, ex *Jacquin*.

Also in South Africa.

9. **S. macrocarpon,** *Linn. Mant. Alt.* 205. A stout subshrub. Stem terete, much branched, smooth, when young sparingly furnished with simple hairs. Leaves ovate, sinuate-repand, generally tapering to the base, 8 in. long, 4 in. wide, glabrous; petiole short, channelled above. Cymes short, racemose, almost leaf-opposed. Calyx campanulate; lobes 5, foliaceous, enlarging in fruit. Corolla broadly campanulate, $1\frac{1}{2}$ in. in diam., blue-purple; lobes 5, broadly triangular. Stamens 5; anthers lanceolate, pores terminal, small. Ovary globose; style rather longer than the stamens. Berry globose, yellow, the size of an apple.—Dunal in DC. Prodr. xiii. i. 353. *S. Mors-elephantum*, Dammann, Cat. No. 70, 100, fig. 81; Wien. Ill. Gartenz. 1894, 30, fig. 7.

Mozamb. Dist. Zanzibar, *Last!* German East Africa, *Stuhlmann*. British Central Africa: Nyasaland, *Buchanan*, 1054! Uganda: 2nd march from Lubwas, *Whyte!*

10. **S. panduræforme,** *E. Meyer in Drège, Zwei Pflanzengeogr. Documente*, 147. A much-branched shrub, 2–4 ft. high; spines few or many, short, subulate from a broad base. Branches terete, densely stellately pubescent. Leaves oblong-lanceolate, sinuate, acute, $2\frac{3}{4}$ in. by 1 in., tapering to the base, stellately pubescent on both surfaces, sometimes spiny on the underside of the midrib; petiole $\frac{1}{2}$ in. long. Cymes pseudo-terminal, racemose, the lowest flower alone fertile. Calyx $\frac{1}{4}$ in. long, 5-toothed or deeply 5-lobed (sometimes on the same

plant), stellately pubescent outside; lobes obtuse. Corolla 1 in. in diam., pink to lilac, 5-partite, stellately pubescent outside; lobes oblong-lanceolate, acute, hairy on the midrib inside. Stamens 5; filaments very short; anthers $2\frac{1}{2}$ lin. long, oblong-lanceolate, with two small apical pores. Ovary ovoid, hirsute at the apex; style 5 lin. long, thickened upwards, stellately hairy at the base. Fruit $\frac{3}{4}$ in. in diam., globose, smooth, yellow.—Dunal in DC. Prodr. xiii. i. 370; C. H. Wright in Dyer, Fl. Cap. iv. ii. 99. *S. delagoense*, Dunal, l.c. 349; Hiern in Cat. Afr. Pl. Welw. i. 747. *S. Baumii*, Dammer in Baum, Kunene-Samb. Exped. 361, 443.

Nile Land. Uganda: Buddu, 3900 ft., *Dawe*, 235!

Lower Guinea. Angola: near Loanda, *Welwitsch*, 6049! Huilla; between Nene and Mumpulla, *Welwitsch*, 6031! by the Habungu brook, *Baum*, 469! German South-west Africa: Omulonga, *Schinz*, 865! Grootfontein, *Schinz*, 869! and without precise locality, *Luderitz*, 12!

Mozamb. Dist. Portuguese East Africa: east coast of Lake Nyasa, *Johnson*, 66! Shupanga, *Kirk!* British Central Africa: Nyasaland, 1700–6000 ft.; Kondowe to Karonga, *Whyte!* Songue to Karonga, *Whyte*, 4! Nyika Plateau, *McClounie*, 51! Zomba, *Whyte!* Mlanji, *Scott!* and without precise locality, *Buchanan*, 533! Matabeleland, *Oates! Elliott!* Ngamiland; Kwebe Hills, *Lugard*, 55! *Mrs. Lugard*, 19! Shesheke, on the Zambesi, *Holub*, 387! 397! 1821!

11. **S. psilostylum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 354. Stem woody, terete, stellately pubescent, unarmed? Leaves oblong-lanceolate, about 3 in. long, $\frac{3}{4}$ in. wide, slightly sinuate or entire, densely covered with minute golden stellate hairs above. and with ashy-grey stellate hairs below. Cymes racemose, extra-axillary, few-flowered; peduncle, pedicels and calyx with golden stellate hairs, mixed with short slender spines here and there. Calyx cupular; lobes 5, triangular-subulate, 2–3 lin. long. Corolla rotate, plicate, $\frac{3}{4}$ in. in diam.; lobes 5, acute, stellately hairy outside the midpetaline areas. Filaments very short; anthers 2–3 lin. long, scarcely attenuate above, pores terminal. Ovary globose; style clavate, $\frac{1}{3}$ in. long, glabrous; stigma bilobed.

Mozamb. Dist. German East Africa: Muansa, on Lake Victoria, *Stuhlmann*, 4160!

When better known, this may have to be united with *S. panduræforme*, E. Meyer.

12. **S. benguelense,** *Wawra & Peyr. Sert. Benguel.* 35. An unarmed shrub 2–3 ft. high, covered with stellate ochraceous tomentum. Leaves lanceolate, obtuse or subacute, entire or undulate, unequal and acute at the base, $1\frac{1}{2}$–3 in. long, scabrid; petiole short. Inflorescence lateral or subterminal, 1–4-flowered. Corolla campanulate, 5-fid, violet, glabrous inside, yellowish tomentose outside. Stamens 5; filaments very short; anthers obtuse. Style rather longer than the stamens. Berry solitary, globose, 1 in. or more in diam., yellow, 4-celled, surrounded by the swollen calyx.

Lower Guinea. Angola; Benguela, *Wawra*, 289.

13. **S. Volkensii,** *Dammer in Engl. Pfl. Ost-Afr. C.* 354. A shrub about 3 ft. high. Branches terete, unarmed, covered with

ashy stellate tomentum. Leaves 3 in. long, 1½ in. wide, ovate-lanceolate, subcordate, acute, slightly repand, green with minute stellate hairs above, ashy and stellately tomentose beneath; petiole 7 lin. long, stellately-tomentose and with a few short spines. Inflorescence extra-axillary, paniculate; flowers polygamo-diœcious, the lowest hermaphrodite. Calyx cupular; lobes subulate, 2 lin. long, densely ashy stellate-tomentose. Corolla violet, rotate, plicate, about 1 in. in diam.; lobes 5 lin. long, ovate-lanceolate; midpetaline areas white stellate-tomentose outside. Filaments very short; anthers ¼ in. long, scarcely attenuate, pores terminal. Ovary globose; style filiform, ⅓ in. long, stellately tomentose below.

Mozamb. Dist. German East Africa: Usaramo, *Stuhlmann*, 6774, 7365; Kilimanjaro, *Volkens*, 1565; Marangu, *Volkens*, 2144.

14. **S. Naumanni,** *Engl. Jahrb.* viii. 64. A shrub or small tree; 2 to 26 ft. high. Branches terete, densely covered with stellate hairs. Leaves oblong, petioled, undulate, 2–3 in. long, 1 in. wide, stellately hairy on both surfaces, nerves prominent beneath. Flowers solitary or in pairs, extra-axillary. Calyx campanulate; segments 5, 2–4 lin. long, 1 lin. wide. Corolla-lobes 5, ?–3 times as long as the calyx-limb. Stamens 5; anthers subsessile, oblong, sagittate, slightly attenuate upwards, 2 lin. long. Ovary ovoid, glabrous; style densely covered with stellate hairs. Berry globose, red, edible, 1½ in. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 747.

Upper Guinea. Sierra Leone: Likuru, *Scott-Elliot*, 4955!

Nile Land. Uganda: Ankole, 4000 ft., *Dawe*, 450!

Lower Guinea. Spanish Gaboon: Muni River, *Mann*, 1872! Lower Congo: Boma, *Naumann*. Angola: Loanda? *Welwitsch*, 6077b! Quiballa, *Monteiro!*

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 155! 1186! 6226!

"Cultivated for its fruit, called Ngilo, eaten as a vegetable."—*Monteiro.*

15. **S. Monteiroi,** *C. H. Wright in Kew Bulletin*, 1894, 127. Suffruticose. Young stem covered with stellate hairs. Leaves oblong, sinuate, 6 in. long, 4 in. wide, unequal at the base, stellate hairs more numerous on the under surface; petiole 2 in. long. Cymes racemose. Calyx campanulate, stellately hairy; segments 5, subulate, ½ in. long. Corolla open campanulate, 1½ in. in diam., purple?; segments triangular, stellately hairy on both surfaces, more densely so outside. Stamens 5; filaments 2 lin. long; anthers ⅓ in. long, pores terminal, small. Berry large, purple, "used as a vegetable" (*Monteiro*).

Lower Guinea. Lower Congo: Boma, *Monteiro!*

This somewhat resembles *S. thonningianum*, Jacq., but differs in having extra-axillary cymes and stellately tomentose leaves and young stems.

16. **S. Stuhlmannii,** *Dammer in Engl. Pfl. Ost-Afr. C.* 354. Herbaceous. Stem angular, stellately tomentose. Leaves ovate-cordate, acute or acuminate, 2–3-lobed, sinuate-dentate, about 5 in. long and nearly as wide, hirsute with adpressed hairs; petiole 3 in. long,

channelled, pilose. Cymes extra-axillary, racemose; peduncle short; pedicels 7 lin. long. Calyx cupular, 5-partite, hirsute; lobes subulate, 2 lin. long. Corolla 5-partite; lobes 5 lin. long, 2 lin. wide, hirsute outside. Filaments very short; anthers cordate-subulate, 3 lin. long. Ovary glabrous; style glabrous, 4 lin. long; stigma lateral. Berry globose, $\frac{1}{3}$ in. in diam.

Mozamb. Dist. German East Africa: Bukoba, *Stuhlmann*, 1577, 3873, 3994.

17. **S. Thomsoni,** *C. H. Wright.* A shrub. Stem terete, densely covered with white stellate hairs, interspersed with longer yellow ones. Leaves oblong, acute, pinnately lobed, about 4 in. long, 2 in. wide, sessile or shortly petioled with brown stellate hairs above, densely matted with white stellate hairs interspersed with longer yellow ones on the nerves when young. Cymes nearly leaf-opposed. Calyx accrescent; segments 5, oblong, $\frac{1}{3}$ in. long, stellately hairy above, with long simple hairs at the base. Corolla rotate, $\frac{3}{4}$ in. in diam., stellately hairy outside, glabrous inside; lobes 5, lanceolate. Stamens 5; filaments very short; anthers oblong-lanceolate, dehiscing by terminal pores, which elongate into longitudinal slits. Ovary globose, stellately hairy; style very short. Berry yellow, 1 in. in diam.

Mozamb. Dist. German East Africa: Lower plateau north of Lake Nyasa, *Thomson!*

18. **S. æthiopicum,** *Linn. Amœn. Acad.* iv. 307, *not of Jacq.* A branched shrub, 1–2 ft. high. Stem terete, glabrous. Leaves oblong, more or less undulate, glabrous, or very slightly scurfy on the upper surface. Cymes umbellate, few-flowered. Calyx cupular; segments ovate-lanceolate. Corolla white, 5–7-fid; segments triangular, acute. Stamens 5–7, shorter than the corolla-lobes; anthers subsessile, oblong-lanceolate, pores terminal, small. Ovary glabrous. Berry globose, smooth or lobed, pale red; seeds flat, subreniform.—Dunal in DC. Prodr. xiii. i. 351.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 3429!

S. æthiopicum, Jacq. (Hort. Vind. i. 4, t. 12), is probably the American *S. texanum*, Dunal, a spiny plant with fruit like a small tomato, which is also figured in Morison's Hist. Pl. Univ. iii. 525, § 13, t. 2.

19. **S. pauperum,** *C. H. Wright in Kew Bulletin*, 1894, 127. Stem woody, branched, terete, slightly rugose, lepidote when young. Leaves lanceolate, $1\frac{1}{2}$ in. long, $\frac{1}{2}$ in. wide, glabrous, slightly crenulate, blackish when dry; petiole $\frac{3}{4}$ in. long. Cymes umbellate, subterminal; pedicels $\frac{1}{3}$ in. long. Calyx cupular, slightly pubescent; teeth 5, ovate, rather shorter than the tube. Corolla rotate; lobes 5, oblong, pubescent outside. Stamens 5: anthers sessile, short, pores small, terminal. Ovary globose; style rather longer than the stamens. Fruit globose, $\frac{1}{3}$ in. in diam., smooth, shining.—Hiern in Cat. Afr. Pl. Welw. i. 746.

Upper Guinea. Gold Coast: Accra, *Ansell!*

Lower Guinea. Angola: *Welwitsch*, 6054! 6074! 6075! Muceques, near Loanda, *Gossweiler*, 106! 494!

Mozamb. Dist. British Central Africa: Nyasaland; Shibisa (Chikwawa), *Kirk!*

20. **S. Gœtzéi,** *Dammer in Engl. Jahrb.* xxviii. 473. An unarmed shrub, about 3 ft. high. Branches terete, densely pulverulent with stellate hairs, reddish at the apex. Leaves lanceolate or obovate, acute or acuminate, attenuate at the base, up to 6 in. long and 2 in. broad, with scattered stellate hairs on both surfaces; petiole 9 lin. long. Inflorescence usually leaf-opposed, racemose, bifid; peduncle short, densely stellate tomentose; pedicels up to 5 lin. long, stellately pilose. Calyx 5-fid stellately pilose; lobes broadly obovate, mucronate. Corolla violet, 7 lin. in diam.; lobes 5, linear-lanceolate, acute, stellately pilose outside. Stamens 5, subequal; filaments short, glabrous; anthers 2 lin. long, tapering upwards. Style longer than the stamens, arcuate at the apex; stigma subglobose. Berry the size of a pea, shining red. Seeds reniform, with large tubercles.

Mozamb. Dist. German East Africa: Usaramo; Kikoka, *Stuhlmann*, 127; Khutu Steppe, 1000 ft., *Goetze*, 112! Usegua; Kiwanla, *Fischer*, 409.

21. **S. nodiflorum**, *Jacq. Ic.* ii. 11, *t.* 326. Stem erect, herbaceous or suffruticose; branches herbaceous, terete, glabrous. Leaves ovate, acuminate, 4 in. long, 2 in. wide, entire, glabrous; petiole $1\frac{1}{2}$ in. long. Cymes umbellate, at or above the nodes, few-flowered. Calyx-lobes 5, oblong, obtuse. Corolla rotate, white, $\frac{1}{3}$ in. in diam.; lobes 5, oblong, acute. Anthers with large oblique pores. Fruit globose, 5–6 lin. in diam., glabrous, black.—Dunal in DC. Prodr. xiii. i. 46; Hiern in Cat. Afr. Pl. Welw. i. 745. *S. nigrum*, var *guineense*, Linn. Sp. Pl. ed. 1, 186; Hiern, l.c. *S. guineense*, Lam. Ill. ii. 18; Engl. Glied. Veg. Usambara, 22, 55, and Pfl. Ost-Afr. C. 351. *S. tinctorium*, Welw. Apont. Phyto-geogr. 551, 590, No. 95, and Syn. Explic. 29, No. 70; Hiern in Journ. Bot. 1895, 75.

Upper Guinea. Senegal, *Roger*, 17! Senegambia, *Brunner!* Sierra Leone, *Vogel*, 108! Gold Coast: Aquapim, *Vogel!* Northern Nigeria: Nupe, *Barter*, 1054! Cameroons: Cameroon Mountain, *Mann*, 1321! Efulen, *Bates*, 279!

Nile Land. Somaliland: Ahl Mountains near Maid, *Hildebrandt*, 1410! Bongo, *Schweinfurth*, 2649! Niamniam, *Schweinfurth*, 3242! Uganda: Ruwenzori, 6000–9000 ft., *Scott-Elliot*, 7659! 7821! various localities, *Wilson*, 77! *Whyte!* British East Africa: various localities, *Whyte! Kässner*, 332! 434!

Lower Guinea. Angola: various localities from Loanda and Ambriz to Huilla, *Gossweiler*, 464! *Monteiro! Welwitsch*, 6033! 6034! 6102! 6103! 6108!

Mozamb. Dist. German East Africa: Kilimanjaro, *Johnston*, 76! Usambara; Amboni, *Holst*, 2840! Uniamwezi; Mininga, *Speke & Grant*, 79! Karagwe, *Speke & Grant*, 453! British Central Africa: River Shire, *Kirk!*

22. **S. nigrum,** *Linn. Sp. Pl. ed.* i. 186. An annual herb. Stem angular, more or less pubescent, up to 2 ft. high. Leaves ovate, obovate or lanceolate, sinuate-dentate, more rarely entire, tapering downwards into the petiole, more or less pubescent with simple hairs on both surfaces, up to 4 by 2 in.; petiole up to 1 in. long. Cymes um-

bellate, few-flowered: peduncle slender, ¾ in. long; pedicels spreading in flower, pendulous in fruit. Calyx cup-shaped; lobes ovate, acute. Corolla rotate, white, ¼ in. in diam.; lobes oblong-lanceolate, acute. Stamens equal; filaments short, cylindrical; anthers 1 lin. long, oblong, obtuse, with 2 oblique pores near the apex. Style slightly longer than the stamens, pubescent below. Berry globose, glabrous, ¼ in. in diam., black, more rarely red or yellow.—Mutel, Fl. Franc. tt. 39–40, figs. 296–303; Dunal in DC. Prodr. xiii. i. 50; Benth. Fl. Austral. iv. 446; Hook. f. Fl. Brit. Ind. iv. 229; Vatke in Linnæa, xliii. 324; Engl. Pfl. Ost-Afr. C. 351; Hiern in Cat. Afr. Pl. Welw. i. 745, excl. var. *guineense*; C. H. Wright in Dyer, Fl. Cap. iv. ii. 89, excl. *S. guineense*; var. *villosum*, Linn. Sp. Pl. ed. i. 186; var. *rubrum*, Vatke, l.c. 325; Engl. l.c. 352. *S. villosum*, Mill. Gard. Dict. ed. 8, n. 2; Engl. l.c. *S. rubrum*, Mill. l.c. n. 4, not of Drège. *S. incertum*, Dunal, Hist. Sol. 155. *S. miniatum*, Bernh. ex Willd. Enum. Hort. Berol. 236; Engl. l.c. 352. *S. retroflexum*, Dunal in DC. Prodr. xiii. i. 50. *S. alatum*, Moench, Meth. 474; Schweinf. Beitr. Fl. Aethiop. 276. *S. erythrocarpon*, Meyer, Prim. Fl. Esseq. 109. *S. suffruticosum*, Schousb. in Willd. Enum. Hort. Berol. i. 236. *S. plebeium*, A. Rich. Tent. Fl. Abyss. ii. 100; Vatke, l.c. 325; Engl. l.c. 352. *S. grossedentatum*, A. Rich. l.c. 101; Schweinf. in Verh. Zool.-Bot. Ges. Wien, xv. (1865) 551.

Nile Land. Nubia: Hor Tamanib, *Lord!* Soturba Mountains, *Schweinfurth*, 1106! sea-coast, *Bent!* Sudan: Sennar and Kordofan, *Kotschy*, 168! 184! 291! 313! 355! 446! Darfur, *Purdy*, 109! Khartoum, *Broun*, 26! *Petherick!* Eritrea, *Schweinfurth & Riva*, 59! 1259! 1319! Abyssinia: various localities, *Steudner*, 734! *Schimper*, 46! 631! *Quartin-Dillon*, 232! *Petit! Wellby!* Somaliland, *James & Thrupp! Miss E. Cole!* Uganda, *Whyte!* British East Africa; near Lake Elmeteita, *Scott-Elliot*, 6760!

Lower Guinea. Angola: various localities, *Welwitsch*, 6035! 6036! 6036B! 6053! 6099! 6101! 6101B! 6109!

Mozamb. Dist. German East Africa: Kilimanjaro, *Thomson!* British Central Africa: Nyasaland; Masuka Plateau, *Whyte!* between Kondowe and Karonga, *Whyte!* Blantyre, *Descamps;* Mount Mlanji, *Purves*, 1!

23. **S. nakurense,** *C. H. Wright in Kew Bulletin*, 1897, 275. A shrub 3 ft. high. Stem quite glabrous. Leaves oblong, more or less acuminate, 1–2 in. long, ½–1 in. wide, entire or slightly sinuate, with a few simple hairs on both surfaces. Calyx campanulate; teeth 4–5, subulate. Corolla rotate, ½ in. in diam.; lobes 4–5, lanceolate, pubescent on both surfaces. Stamens 4–5; anthers subsessile, oblong, dehiscing longitudinally. Ovary oblong, glabrous; style nearly twice as long as the stamens.

Nile Land. Uganda: various localities between Nandi and the Upper Mau Plateau, *Whyte!* near Lake Nakuru, 6000 ft., *Scott-Elliot*, 6800!

24. **S. carense,** *Dunal in DC. Prodr.* xiii. i. 105. A bush. Stem woody, terete; young branches stellately hairy. Leaves broadly ovate or suborbicular, entire or slightly sinuate, 1½ in. long, 1 in. wide, with a few scattered stellate hairs on both surfaces; petiole 6–9 lin. long

Flowers few in short racemes; pedicels up to $\frac{1}{2}$ in. long. Calyx 2 lin. long, stellately hairy; lobes 5, oblong. Corolla rotate, $\frac{3}{4}$ in. in diam., stellately hairy outside; lobes 5, oblong-lanceolate. Stamens 5; anthers subsessile, $\frac{1}{4}$ in. long, tapering upwards, pores terminal, small. Style filiform, much longer than the anthers, recurved at the apex. Berry globose, 5 lin. in diam.

Nile Land. Somaliland: Hahi, Boobi and Zafarug, *James & Thrupp! Kirk!* Shail Pass, Dooloo and Djedaynio, *Miss Edith Cole!* and without precise locality, *Appleton!*

Also in Arabia, where the wood is used for making spoons.

25. **S. hirtulum,** *Steud. ex A. Rich. Tent. Fl. Abyss.* ii. 101. A branched herb, 6 in. high, covered with simple hairs. Stem green, striate. Leaves ovate-oblong, acute, 2 in. long, $\frac{1}{2}$ in. wide, undulate, ciliate, narrowed into a margined petiole; lateral veins 5–6 on each side. Inflorescence racemose, nearly leaf-opposed, 3–4-flowered; pedicels slender, 3–5 lin. long, erect in flower, pendulous in fruit. Calyx cyathiform, scarcely 1 lin. in diam.; lobes 5, ovate, obtuse, enlarging after flowering. Corolla white, $\frac{1}{3}$ in. in diam.; segments 5, ovate-oblong, acuminate or acute. Stamens 5; anthers conniving, dehiscing by lateral slits. Style rather longer than the stamens; stigma capitate. Young fruit blackish when dry.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 977!

26. **S. campanuliflorum,** *C. H. Wright in Kew Bulletin*, 1894, 127. Suffruticose? Stem terete, clothed with simple hairs. Leaves ovate, acuminate, entire, 2 in. long, 1 in. wide, hairs on both surfaces simple; petiole 1 in. long. Inflorescence extra-axillary, few-flowered; peduncle 1 in. long. Calyx campanulate, 1 lin. long; lobes 5, oblong, obtuse, shorter than the tube. Corolla campanulate; lobes 5, lanceolate, $\frac{1}{3}$ in. long, hairy outside. Stamens 5; anthers rather longer than the filament, pores anticous. Ovary globose; style short, pubescent.

Lower Guinea. Angola: near the Cunene River, *Johnston!*

27. **S. lykipiense,** *C. H. Wright.* Stem woody. Leaves ovate or ovate-oblong, obtuse, entire or obscurely serrate, about 1 in. long, 5 lin. wide, with simple hairs on both surfaces and densely ciliate on the margin; petiole 1 lin. long. Cymes lateral, few-flowered; peduncle slender, glabrous; pedicels $\frac{1}{2}$ in. long, glabrous, clavate. Calyx pubescent outside; lobes 5, oblong, obtuse. Corolla about 7 lin. in diam., pubescent outside; lobes 5, oblong, obtuse. Filaments very short; anthers nearly 2 lin. long, oblong, terminal pores large. Style glabrous, clavate, a little longer than the stamens.

Nile Land. British East Africa: Lykipia, 6000–8000 ft., *Thomson!*

The specimen from which this description is drawn up is about 6 in. long, but sufficient to show that the species is a very distinct one.

28. **S. pseudospinosum,** *C. H. Wright.* Stem slightly woody, 1 ft. high, 4-angled, pilose with simple hairs, a few becoming hard at the base. Leaves ovate, acuminate, obtuse, with simple hairs on both

surfaces, more or less cuneate at the base, 1½ in. long, nearly 1 in. wide. Cymes racemose, few-flowered; peduncle and pedicels pilose; pedicels clavate, ½ in. long. Calyx campanulate, pubescent; lobes 5, ovate. Corolla 5 lin. long; tube short, glabrous outside; lobes ovate, hairy outside. Anthers subsessile, oblong, obtuse, nearly 1 lin. long, pores oblique. Style longer than the stamens; stigma capitate. Berry ¼ in. in diam., globose, seated on the accrescent calyx.—*S. nigrum*, forma, Hook. f. in Journ. Linn. Soc. vii. 209.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–10000 ft., *Mann*, 1938!

29. **S. subulatum,** *C. H. Wright.* An unarmed shrub, stem, leaves and inflorescence covered with scurfy stellate hairs when young. Leaves oblong, acute at both ends, 6 in. long, 2 in. wide; petiole 2 in. long. Inflorescence extra-axillary, many-flowered, the first 4 or 5 divisions dichotomous. Calyx cupular; teeth 5, distant, subulate. Corolla divided nearly to the base; lobes 5, oblong, acute, 2 lin. long, with stellate hairs outside; midrib prominent within. Anthers subsessile, slightly tapering to the apex. Ovary globose; style linear, rather longer than the anthers, with stellate hairs on the lower part.

Mozamb. Dist. British Central Africa: Nyasaland; Masuka Plateau, 6500–7000 ft., *Whyte*, 280!

30. **S. verbascifolium,** *Linn. Sp. Pl. ed.* i. 184. An unarmed shrub or almost a tree. Leaves ovate-oblong, acuminate, quite entire, up to 8 in. long, upper surface with adpressed stellate hairs, lower mealy with dense stellate tomentum. Inflorescence corymbose, subterminal, at length lateral, mealy (except inside the corolla) with stellate tomentum; peduncle usually forked. Calyx-tube campanulate, 2 lin. long; lobes not quite as long as the tube, broadly triangular. Corolla ½ in. in diam., white, rarely pale blue; tube short; lobes 5, oblong. Filaments very short; anthers oblong, obtuse, pores slightly oblique, wide. Berry globose, up to ½ in. in diam., yellow.—Jacq. Hort. Vind. i. t. 13; Dunal in DC. Prodr. xiii. i. 114; Benth. Fl. Austr. iv. 449; C. B. Cl. in Hook. f. Fl. Brit. Ind. iv. 230.

Upper Guinea. Lagos, *Millen*, 50!
Lower Guinea. Angola: Malange, *Gossweiler*, 1105!
Also in Tropical Asia, North Australia, and Tropical America.

31. **S. schimperianum,** *Hochst. in Flora*, 1841, i. *Intell.* 24. A shrub about 5 ft. high. Stem terete, stellately hairy when young, glabrous when old. Leaves ovate, acute, about 1 in. long, ¾ in. wide, covered with more or less deciduous stellate hairs; petiole channelled above. Inflorescence few-flowered. Calyx cyathiform, 2 lin. long, 4-partite. Corolla ½ in. in diam., stellately hairy outside; lobes 4, ovate-oblong, longer than the tube. Stamens 4; anthers 1¼ lin. long, oblong, obtuse. Stigma slightly 2-lobed. Berry globose, 5 lin. in diam. —Dunal in DC. Prodr. xiii. i. 94; Vatke in Linnæa, xliii. 326: Engl. Pfl. Ost-Afr. C. 352.

Nile Land. Nubia: Wadi Harrassa, between Suakin and Berber, *Schweinfurth*, 245! Abyssinia: Mount Sholoda, near Adowa, *Schimper*, 202!

32. **S. senegambicum,** *Dunal in DC. Prodr.* xiii. i. 194. A shrub. Branches flexuose, blackish, stellately tomentose. Leaves solitary or geminate, ovate-lanceolate, acuminate, entire or subrepand, stellately hairy, 3–4 in. long; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. long. Cymes extra-axillary, 8–9-flowered. Calyx subcampanulate, 4-fid; lobes acute, stellately tomentose. Corolla $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., 4-partite; lobes ovate-lanceolate, acute, glabrous inside, stellately hairy outside. Stamens 4, equal; filaments white, complanate, very short; anthers pale yellow, 1 lin. long, pores terminal. Ovary globose, glabrous; style filiform, 2 lin. long, stellately tomentose. Berry globose, orange, 4–5 lin. in diam.

Upper Guinea. Senegambia, *Heudelot*, 713.

33. **S. polyanthemum,** *Hochst. ex Dunal in DC. Prodr.* xiii. i. 94. A shrub. Branches subdichotomous, flexuose, covered with ochraceous stellate hairs. Leaves ovate-lanceolate, acuminate, up to 3 in. by $1\frac{1}{2}$ in., stellately hairy above, more densely so beneath; petiole up to 1 in. long. Cymes short, racemose, 2-fid, terminal or lateral; pedicels $\frac{3}{4}$ in. long in fruit. Calyx cyathiform, 2 lin. long, stellately tomentose outside; tube very short; lobes oblong from a wide base. Corolla deeply 5-fid, stellately tomentose outside, glabrous inside; lobes ovate. Stamens 5, half as long as the corolla. Ovary globose, pubescent at the apex; stigma capitate. Berry globose, 5 lin. in diam., yellow?—Engl. Glied. Veg. Usambara, 26, and Pfl. Ost-Afr. C. 352.

Nile Land. Eritrea: near Acrur, 4300 ft., *Schweinfurth & Riva*, 1004! Abyssinia: near Axum, *Schimper*, 1526!

34. **S. catombelense,** *Peyritsch in Sitz. Akad. Math.-Nat. Wien*, xxxviii. (1860) 576. Suffruticose, about 2 ft. high. Stem terete, densely covered with stellate hairs. Leaves lanceolate, 1–3 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ in. wide, more or less undulate, stellately tomentose on both surfaces; petiole $\frac{1}{2}$ in. long. Inflorescence extra-axillary, racemose, 4–5-flowered; pedicels reflexed after flowering. Calyx campanulate; lobes 5, as long as the limb, stellately hairy outside. Corolla rotate, 3 times longer than the calyx, milk-white to violet, stellately hairy outside; lobes 5, oblong, acute. Stamens 5; filaments very short; anthers lanceolate, pores terminal. Ovary globose, stellately hairy above. Fruit globose, 3–5 lin. in diam., smooth, scarlet or orange.—Hiern in Cat. Afr. Pl. Welw. i. 748. *S. albotomentosum*, C. H. Wright in Kew Bulletin, 1894, 128.

Lower Guinea. Angola: Loanda; near Maianga do Povo, *Welwitsch*, 6048! Praia de Conceiçao *Welwitsch*, 6077! Muceques, *Gossweiler*, 116! Catombela, *Wawra*, 268.

35. **S. mossambicense,** *Klotzsch in Peters, Reise Mossamb. Bot.* 235. A branched unarmed shrub, covered with stellate tomentum. Branches terete. Leaves oblong, subacute, $1\frac{1}{2}$–3 in. long, 5–10 lin. wide,

attenuate at the base, petiolate, green and with sparing stellate pubescence above, and copious ashy-white tomentum beneath. Racemes extra-axillary, near the apex of the branches, few-flowered. Calyx 5-toothed, pubescent. Corolla funnel-shaped, 5-fid; lobes ovate, acute, pubescent outside. Anthers short, oblong, attenuate above. Style cylindrical, straight, longer than the stamens, stellately hairy below.—Engl. Pfl. Ost-Afr. C. 355.

Mozamb. Dist. Portuguese East Africa: throughout the province of Mozambique, *Peters*.

36. **S. distichum,** *Thonn. in Schumach. & Thonn. Beskr. Guin. Pl.* 122. An unarmed shrub, furnished with stellate tomentum. Leaves geminate, unequal, ovate, slightly attenuate towards the apex, entire or slightly repand, subequal at the base, 4–7 in. long, puberulous above, stellately hairy beneath; petiole 1½ in. long, terete. Cymes racemose, nearly leaf-opposed, 8–12-flowered; pedicels distichous, thickened in fruit. Calyx widely campanulate; lobes 5, rather acute, tomentose. Corolla rotate, "size of that of *S. nigrum*," white; tube short; lobes 5, acute. Stamens 5; filaments very short; anthers oblong, erect, pores terminal. Ovary subrotund, glabrous; style filiform, scarcely longer than the stamens, stellately hairy; stigma obtuse. Berry small, globose, glabrous, red. Seeds subovoid, compressed.—Dunal in DC. Prodr. xiii. i. 130.

Upper Guinea. Gold Coast: Aquapim, *Thonning*.

37. **S. Reichenbachii,** *Vatke in Linnæa*, xliii. 330. An unarmed shrub. Branches angular, covered when young with pale yellow floccose tomentum. Leaves geminate, ovate-oblong, 2–3 in. long, tomentose along the nerves above, densely covered with white floccose tomentum beneath; petiole ¾ in. long. Cymes axillary or extra-axillary, 2–5-flowered. Calyx cyathiform-campanulate, stellately tomentose. Corolla small, 5-fid; lobes subtriangular, obtuse, villous outside. Anthers small, oval. Style filiform, glabrous. Berry subglobose, glabrous.

Nile Land. Somaliland: Ahl Mountains, *Hildebrandt*, 834d.

38. **S. geminifolium,** *Thonn. in Schumach. & Thonn. Beskr. Guin Pl.* 121. An unarmed branched shrub, 2 ft. high. Stem terete, covered with stellate hairs. Leaves geminate, unequal, ovate, entire or subrepand, subacute, subequal at the base, 4–8 in. long, stellately hairy on both surfaces; petiole terete, 1½ in. long. Cymes racemose, extra-axillary; pedicels 8–20, cernuous, incrassate in fruit. Calyx campanulate, 5-fid; lobes acute, furnished with a few stellate hairs. Corolla campanulate, white, ⅓ in. in diam.; tube as long as the calyx; lobes 5, ovate-lanceolate. Stamens 5; filaments very short; anthers oblong, free. Ovary subrotund, glabrous, 2–4-celled; style filiform, as long as the stamens, pubescent below; stigma obtuse. Berry subrotund, glabrous, yellow, size of a plum, fleshy.—Dunal in DC.

Prodr. xiii. i. 352; J. Braun in Mitth. Deutsch. Schutzgeb. ii. (1889) 173.

Upper Guinea. Guinea (Gold Coast ?) : cultivated land, *Thonning*. Togo, *Braun*.

39. **S. albifolium,** *C. H. Wright in Kew Bulletin*,1894, 127. A shrub or small tree. Stem terete, when young clothed with white stellate hairs. Leaves pinnately lobed about halfway to the midrib, 5 in. long, 3 in. wide, dark green with a few deciduous stellate hairs above, densely tomentose with white stellate hairs beneath; petiole ½ in. long. Inflorescence nearly leaf-opposed, cymose. Calyx cupular, densely white stellate hairy outside; teeth 5, triangular, much shorter than the tube. Corolla rotate; lobes 5, linear, stellately hairy outside, pubescent along the midrib within. Stamens 5; anthers subsessile, lanceolate, pores small, terminal. Ovary globose, hairy; style short, subulate. Fruit globose, 5 lin. in diam., sulphur-coloured, smooth. —Hiern in Journ. Bot. 1895, 74, and Cat. Afr. Pl. Welw, i. 747. *S. saponaceum*, Welw. Apont. Phyto-Geogr. 551, 588; Ficalho, Pl. Uteis, 232; Monteiro, Angola, ii. 111, not of Dunal.

Lower Guinea. Angola: Golungo Alto; near Quibixe, *Welwisch,* 6095! 6095b! Bumbo: Chella Mountains, *Welwitsch*, 6040!

"Fruit used for washing cloths, &c., instead of soap." *Monteiro*, l.c.

40. **S. scalare,** *C. H. Wright in Journ. Linn. Soc.* xxx. 93. Suffruticose. Stem terete, covered with stellate hairs. Leaves ovate-oblong, acute or shortly acuminate, undulate, 4 in. long, 2–3 in. wide, stellately hairy on both surfaces. Inflorescence extra-axillary, distinctly racemose; pedicels about 10, distichous, up to 5 lin. long in fruit. Calyx cupular; lobes 5, subulate, covered with stellate hairs. Corolla rotate, 5 lin. in diam., white or violet; lobes 5, oblong, twice as long as the calyx, stellately hairy outside, glabrous within. Stamens 5; anthers oblong, subsessile, nearly as long as the corolla-lobes, pores terminal. Ovary globose, stellately hairy; style subulate, as long as the stamens, covered with stellate hairs. Berry globose, ¼ in. in diam., smooth, shining red.—Hiern in Cat. Afr. Pl. Welw. i. 749.

Upper Guinea. Sierra Leone: near Mofari, *Scott-Elliot*, 4394! Sakaro, *Scott-Elliot*, 4898! and without precise locality, *Garrett,* 18! Gold Coast: Aburi, *Brown,* 320! Lagos: Oshogbo, *Moloney!* near Lagos, *Rowland,* 4! Northern Nigeria: confluence of the Niger and Benue Rivers, *Barter!* Southern Nigeria: Cross River Expedition, *Holland*, 188!

Lower Guinea. Angola: Golungo Alto; near Sange, *Welwitsch*, 6088! near Camilungo, *Welwitsch*, 6089! palm groves by the River Quibolo, *Welwitsch*, 6090! Pungo Andongo; banks of the River Casabalé, *Welwitsch*, 6104!

41. **S. Heudelotii,** *Dunal in DC. Prodr.* xiii. i. 205. A shrub. Branches slender; spines reflexed, reddish-yellow. Leaves ovate-elliptic or ovate-lanceolate, 6–10 lin. long, 3–5 lin. wide, tomentose when young, glabrous or slightly pilose in age; primary veins 2–3 on each side; petiole 3–4 lin. long. Inflorescence racemose, few-flowered, rhachis scurfy tomentose, slightly spiny. Calyx cyathiform, 1½ lin.

in diam., 5-fid, unarmed, accrescent; teeth acute. Corolla 5-partite, 6–7 lin. in diam.; lobes oblong, slightly reflexed, glabrous inside, tomentose outside. Stamens 5, erect; filaments very short; anthers 2 lin. long. Style filiform, twice as long as the stamens; stigma subcapitate. Berry globose, glabrous, $\frac{1}{4}$ in. in diam., orange?

Upper Guinea. Senegambia, *Heudelot*, 417!

42. **S. macracanthum,** *A. Rich. Tent. Fl. Abyss.* ii. 106. A much-branched, very spiny herb. Branches terete, covered with stellate hairs; spines robust, straight, yellow, glabrous. Leaves oblong-oval, obtuse, subentire or sinuate-pandurate, 1 in. long, stellately hairy on both surfaces and spiny on the midrib, petioled. Cymes lateral, few-flowered. Calyx 5-fid, hirsute, aculeate. Corolla-lobes ovate-lanceolate, acute, hirsute. Berry the size of a cherry, orange, glabrous.

Nile Land. Abyssinia: Shoa, *Petit*.

43. **S. albicaule,** *Kotschy ex Dunal in DC. Prodr.* xiii. i. 204. A shrub. Stem terete, slender, covered when young with white stellate tomentum; spines compressed, recurved. Leaves ovate, acuminate, sometimes slightly lobed with stellate hairs on both surfaces, up to $1\frac{1}{2}$ in. long and 1 in. wide; petiole $\frac{1}{3}$ as long as the blade. Inflorescence extra-axillary, racemose, usually bifid; lower pedicels deciduous, leaving black scars. Calyx short, campanulate, 5-fid, stellately tomentose outside. Corolla rotate, stellately tomentose outside; lobes 5, linear, 5 lin. long. Stamens 5; filaments very short; anthers with terminal pores. Ovary globose, glabrous; style of lower flowers shorter than the anthers, of terminal longer. Berry pendulous, globose, $\frac{1}{4}$ in. in diam., glabrous.—Schweinf. in Verh. Zool.-Bot. Ges. Wien, xv. (1865) 551; Vatke in Linnæa, xliii. 326; Engl. Pfl. Ost-Afr. C. 352; Zarb in Cat. Spéc. Bot. Pfund, 31. *S. scindicum*, Prain in Journ. As. Soc. Beng. lxv. 542.

Nile Land. Nubia: Sotuba Mountains, *Schweinfurth;* Uaratab Mountains, Suakim, *Schweinfurth*, 1362! Hor Tamanib, *Lord*, 2! 37! Sea-coast, *Bent!* Kordofan, *Kotschy*, 309! 418! *Pfund*, 107! 373! 646! Eritrea; Mount Ghedem, near Massowa, 500–1000 ft., *Schweinfurth & Riva*, 82! Abyssinia, *Plowden!* Somaliland: Darror and Harradigit, *James & Thrupp!*

Also from Scinde to Egypt.

44. **S. kwebense,** *N. E. Br.* An erect branching shrub, 4–5 ft. high. Branches rather slender, 1–$1\frac{1}{2}$ lin. thick, at first densely covered with close white or pale yellow stellate tomentum, then pruinose, finally glabrous, unarmed or with a few small spines. Leaves lanceolate or ovate-lanceolate, obtuse, broadly cuneate or acute at the base, thinly covered with minute stellate adpressed hairs above, more densely so beneath, at length nearly glabrous on both surfaces. Cymes small, 2–7- (sometimes 1-) flowered, stellately tomentose; peduncles $1\frac{1}{2}$–4 lin. long; pedicels 2–6 lin. long. Calyx campanulate, $1\frac{1}{2}$ lin. long, stellately tomentose outside, 5-lobed nearly half-way down; lobes deltoid-ovate, subacute. Corolla rotate or reflexed, 5-lobed, white or

mauve, glabrous inside; lobes 3 times as long as the tube, 4–5 lin. long, 1½ lin. wide, oblong-lanceolate, subacute. Stamens 5, uniform; filaments very short; anthers ¼ in. long, linear-oblong, pores terminal. Berry globose, about ¼ in. in diam., scarlet.

Mozamb. Dist. British Central Africa: Ngamiland: Kwebe Hills, 3300 ft. *Lugard*, 50! *Mrs. Lugard*, 62!

45. **S. melastomoides,** *C. H. Wright in Kew Bulletin*, 1894, 128. A slender shrub. Stem slender, terete, dark brown, covered with white stellate hairs when young; spines straight or slightly curved, 3–5 lin. long, slightly compressed. Leaves solitary, ovate-oblong or oblong, entire or very slightly sinuate, up to 2 in. long and 1½ in. wide, stellately hairy on both sides, sometimes spiny on the midrib; petiole ¼ in. long, unarmed or nearly so. Cymes extra-axillary, about 9-flowered. Calyx cupular, 2 lin. long, stellately tomentose outside; lobes 5, roundish. Corolla broadly campanulate, plicate, 1¼ in. in diam., stellately hairy outside the midpetaline areas. Stamens 5; four filaments ½ lin. long, the fifth ¼ in.; anthers ¼ in. long, obtuse, pores slightly oblique. Style rather longer than the stamens, hooked and thickened at the apex.

Nile Land. Somaliland: Boobi and Harradigit, *James & Thrupp!* Dooloo, *Miss Edith Cole.*

46. **S. hastifolium,** *Hochst. ex Dunal in DC. Prodr.* xiii. i. 284. A shrub. Stem slender, terete, sparingly hairy; spines short, recurved, compressed. Leaves hastate or more or less pinnately lobed, 1½ in. long, ½ in. wide, with scattered stellate hairs on both surfaces, unarmed. Inflorescence lateral and terminal on the branches, racemose or reduced to a single flower. Calyx 5-fid, stellately hairy; lobes acute. Corolla 5-partite, stellately hairy outside; lobes narrow, acute, 5 lin. long. Stamens 5; anthers subsessile, rather shorter than the corolla-lobes, lanceolate, pores small, terminal. Ovary globose; style much longer than the anthers. Berry globose, smooth, ⅓ in. in diam.

Nile Land. Kordofan: on various mountains, *Kotschy*, 71! 393! *Pfund*, 330! 342! 643! Sennar: Abu Harras, *Schweinfurth*, 1401! Abyssinia: Jaja, 4000 ft., *Schimper*, 2328! Uganda: near Lake Baringo, *Johnston!*

A more robust hairy form with larger subentire leaves was collected on mountains near Gageros, in Abyssinia, by Schimper (2327a!). This species has been confused with *S. trilobatum*, Linn., which does not appear to occur in Tropical Africa.

47. **S. taitense,** *Vatke in Linnæa*, xliii. 327. A much-branched shrub. Branches glabrous; spines few, compressed, slightly recurved. Leaves ovate or linear-lanceolate, obtuse, entire or slightly repand, stellately tomentose on both sides, 1 in. long. Flowers solitary or in pairs; peduncle filiform, 5 lin. long, tomentose. Calyx shortly cup-shaped, unarmed, 5-partite; lobes linear from an ovate base, obtuse. Corolla twice as long as the calyx, 5 lin. in diam., deeply 5-lobed; lobes attenuate, rather obtuse, ¼ in. long, ½ lin. wide, stellately tomentose outside, glabrous within. Stamens 5, shorter than the corolla; anthers subsessile, oblong-linear, subconnivent, pores terminal. Style filiform,

hirsute, $\frac{1}{3}$ in. long, recurved at the apex.—*S. teitense*, Dammer in Engl. Pfl. Ost-Afr. C. 353.

Nile Land. British East Africa: desert between Ndi Mountain and the River Tsavo, *Hildebrandt*, 2605.

48. **S. sepicula,** *Dunal in DC. Prodr.* xiii. i. 283. A slender shrub. Stem glabrous; spines short, recurved from a broad compressed base. Leaves pinnately lobed, $1\frac{1}{2}$ in. long; lobes 1–2 lin. wide, glabrous. Cymes racemose, extra-axillary; pedicels thickened upwards. Calyx cupular; lobes 5, triangular. Corolla rotate, slightly pubescent outside; lobes 5, linear, acute, $\frac{1}{4}$ in. long, 1-nerved. Stamens 5, nearly as long as the corolla-lobes; anthers subsessile, lanceolate, pores small, terminal. Ovary globose; style rather longer than the anthers, furnished with simple hairs below. Berry red, $\frac{1}{3}$ in. in diam., pendulous. —Vatke in Linnæa, xliii. 327; Kew Bulletin, 1894, 337. *S. Palmetorum*, Dunal, l.c. 282.

Nile Land. Abyssinia: Efat, *Roth*, 446! Alinamboo, *Roth*, 447! Somaliland, *Miss Edith Cole!*

Also in Arabia.

49. **S. stipitato-stellatum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353. A shrub about 6 ft. high. Branches slender, terete, sparingly spiny, with rusty stellate tomentum on the younger parts; spines straight, slender, 1–2 lin. long, woody below, densely covered with stalked stellate hairs. Leaves lanceolate, with rusty stellate tomentum on both surfaces, undulate, spiny on the midrib; petiole 2–3 lin. long. Cymes racemose, extra-axillary, few-flowered; peduncle and pedicels covered with stellate tomentum, slightly spiny. Calyx 5-partite, pale blue, 1 in. in diam.; lobes stellately tomentose outside. Filaments short; anthers $\frac{1}{4}$ in. long, attenuate upwards. Ovary subglobose, glabrous; style 5 lin. long, glabrous; stigma obliquely bifid. Berry ellipsoid, 7 lin. long, 4 lin. in diam.—Engl. Glied. Veg. Usambara, 63.

Mozamb. Dist. German East Africa: Usambara; Kwa Mshuza, *Holst*, 9121! British East Africa: near Maji Chumois, *Kässner*, 472!

50. **S. rigescens,** *Jacq. Hort. Schœnbr.* i. 19, *t.* 42. Stem shrubby, 2 ft. high, erect, terete; spines 2 lin. long, subulate from a broad base; branches stellately hairy when young. Leaves ovate in general outline, sinuately 5–7-lobed, with stellate hairs on both surfaces, those on the upper having one ray much longer than the rest, spiny on the chief nerves, unequal at the base, 3 by 2 in.; lobes entire, obtuse. Cymes racemose, few-flowered. Calyx-tube cup-shaped; lobes linear, 2 lin. long. Corolla violet or deep purple, 10 lin. in diam., widely campanulate, hairy outside and on the midrib inside; lobes broadly triangular, about $\frac{1}{4}$ in. long; filaments short; anthers $\frac{1}{4}$ in. long, oblong-lanceolate, pores small, terminal. Style $\frac{1}{2}$ in. long, thickened and curved upwards. Berry $\frac{1}{2}$ in. in diam., globose, black or reddish, smooth.—Dunal in DC. Prodr. xiii. i. 301; C. H. Wright in Dyer, Fl. Cap. iv. ii. 96. *S. rubetorum*, Dunal, l.c. 304.

Lower Guinea. German South-west Africa: Hereroland; Onanis, *Belck*, 6! Also in South Africa.

51. **S. gracilipes,** *Decsne. in Jacq. Voy. Ind.* 113, *t.* 119. A slender shrub. Stem terete, stellately hairy when young; spines few, 2 lin. long, more or less recurved. Leaves rotundate or broadly ovate, 1 in. long, ¾ in. wide, attenuate into a petiole 5 lin. long, stellately hairy when young, unarmed. Flowers solitary or in pairs, axillary; pedicels 1 in. long, very slender. Calyx campanulate; lobes 5, distant, subulate, nearly 2 lin. long, stellately hairy outside. Corolla rotate, 5-partite; lobes narrow, acute, stellately hairy outside. Stamens 5; anthers subsessile, ¼ in. long, pores terminal. Ovary globose, glabrous; style longer than the stamens. Fruit globose, glabrous.—Dunal in DC. Prodr. xiii. i. 286; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 237. *S. Jacquemonti*, Dunal, l.c. 287.

Nile Land. Somaliland: Boobi and Hahi, *James & Thrupp!*

Also in the drier parts of India, Beloochistan, and Socotra.

52. **S. piperiferum,** *A. Rich. Tent. Fl. Abyss.* ii. 106. A small shrub. Stem cylindrical, rough; spines numerous, straight, 5 lin. long. Leaves ovate, obtuse, entire or more or less pinnatifid, ½ in. long, ¼–⅓ in. broad, covered with stellate hairs, usually unarmed, rarely with 1–2 spines; petiole short. Cymes extra-axillary, few-flowered. Calyx stellately hairy outside; lobes 5, linear. Corolla broadly campanulate, 5-lobed, tomentose outside. Berry globose, ¼ in. in diam., smooth, pendulous.

Nile Land. Abyssinia: Mountains near Chelicut, *Petit*, 226! *Rüppell!*

53. **S. aculeatissimum,** *Jacq. Collect.* i. 100 *and Ic. t.* 41. An undershrub, 1–2 ft. high. Stem branched, furnished with straight spines, interspersed in the younger parts with stiff bristles. Leaves solitary or geminate, broadly ovate or ovate-cordate, pinnately 5–7-lobed, 4 in. long, 3 in. wide, with rigid adpressed hairs on both surfaces and spines on the upper surface of the principal nerves; petiole 1 in. long. Cymes extra-axillary, few-flowered. Calyx campanulate; lobes 5, triangular, closely beset with spines. Corolla rotate, 1 in. in diam., snow-white; lobes lanceolate. Stamens 5; anthers subsessile, lanceolate-oblong, 5 lin. long, pores terminal, small. Ovary globose, glabrous; style as long as the anthers. Fruit globose, 1 in. in diam., smooth, orange. Seeds flat, ¼ in. in diam.—Dunal in DC. Prodr. xiii. i. 244; Sendtn. in Mart. Fl. Bras. x. 59; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 237; Engl. Pfl. Ost-Afr. C. 352, and Glied. Veg. Usambara, 53; C. H. Wright in Dyer, Fl. Cap. iv. ii. 97. *S. ciliatum*, Lam. Encycl. ii. 21; Dunal, l.c. 241; Baum, Kunene-Samb. Exped. 360. *S. myriacanthum*, Dunal, Hist. Solan. 218, t. 19.

Nile Land. Bahr el Jebel Kamissa, *Muriel*, 77! Uganda: Nandi district, *Whyte!*

Lower Guinea. Princes Island, *Mann*, 1110! West Tropical Africa, *Jardine!* Angola: between Matucua and Humpe, 2800 ft., *Baum*, 83.

54. **S. giganteum,** *Jacq. Collect.* iv. 125, *and Ic. t.* 328. A shrub or tree up to 25 ft. high. Branches terete, tomentose; spines ½–1½ lin. long, broad-based, much compressed. Leaves elliptic-lanceolate, acute, 4–7 in. long, 1½–3 in. wide, unarmed, glabrous above, white tomentose beneath. Cymes terminal, corymbose, many-flowered. Calyx cyathiform, 1½ lin.in diam.; lobes 5, ovate-cuneate, acute or shortly acuminate. Corolla 4–5 lin. in diam., white tomentose outside, glabrous within, violet-purple; lobes 5, lanceolate, acuminate, 2 lin. long. Stamens 5, uniform, about half as long as the corolla; anthers 1 lin. long, pore small, terminal. Ovary globose, glabrous. Berry the size of a pea, glabrous, shining red.—Dunal, Hist. Solan. 202 and in DC. Prodr. xiii. i. 258; Bot. Mag. t. 1921; Nees in Trans. Linn. Soc. xvii. 47; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 233; Engl. Glied. Veg. Usambara, 52; C. H. Wright in Dyer, Fl. Cap. iv. ii. 94. *S. niveum,* Thunb. Prodr. 36; Vahl, Symb. ii. 41. *S. farinosum,* Wall. Cat. 2610. *S. argenteum,* Heyne ex Wall. l.c., not of Dunal.

Nile Land. Abyssinia, *Schimper,* 1338! Uganda: between Nandi and Kakanagas, 4000–4500 ft., *Whyte!* and without precise locality, *Wilson,* 132!

Mozamb. Dist. German East Africa: Usambara, Kwa Mshuza, *Holst,* 9031! Transvaal: Pisang Kops, Zoutpans Berg, *Nelson,* 356!

Also in South Africa and India.

55. **S. Renschii,** *Vatke in Linnæa,* xliii. 328. A shrub or subshrub. Stem terete, covered when young with ashy-white stellate hairs; spines 2 lin. long, broad-based. Leaves solitary or geminate, ovate-oblong or elliptic, obtuse, 2–3 in. long, 1¼ in. wide, cuneate at the base, dark green above, paler beneath, stellately hairy on both surfaces, more densely on the lower; petiole ¾ in. long. Cymes corymbose, leaf-opposed; pedicels incrassate. Calyx cupular, 2 lin. long, stellately hairy outside, unarmed; lobes 5, obtuse. Corolla 5-partite, stellately hairy outside, glabrous within; lobes linear, acute, ¼ in. long. Stamens 5; anthers subsessile, oblong, pores terminal. Ovary globose, glabrous; style rather longer than the stamens, glabrous. Berry globose, ¼ in. in diam., brownish-yellow, shining.—Engl. Pfl. Ost-Afr. C. 352.

Nile Land. British East Africa: Mount Ndi, *Hildebrandt,* 2484! *Scott-Elliot,* 6216! Ukamba; Kitui, *Hildebrandt,* 2735! Sultan Lamond, *Kässner,* 656! Makindu River, 3200 ft., *Kässner,* 565! Taveta, near Kilimanjaro, 2000 ft.; *Johnston!*

Mozamb. Dist. Portuguese East Africa: near Tete, *Kirk!*

56. **S. vagans,** *C. H. Wright in Kew Bulletin,* 1894, 128. Stem woody, branched, terete, furnished with minute brown stellate hairs; spines short, compressed, recurved from a broad base. Leaves solitary, oblong-lanceolate, entire or lobed, acute or acuminate, 3 in. long, 1 in. wide, tapering towards the base, covered on both surfaces with small brownish stellate hairs; petiole ½ in. long. Cymes extra-axillary. Calyx cupular, 4-toothed and -ribbed, stellately brown pubescent outside. Corolla rotate; tube shorter than the calyx; lobes 4, ligulate, ½ in. long, 1 lin.

wide, stellately brown hairy outside. Stamens 4; filaments short; anthers 5 lin. long, lanceolate, pores terminal, minute. Ovary globose; style shorter than the stamens.

Nile Land. Eritrea: Keren, *Steudner*, 722!

Mozamb. Dist. German East Africa: Dar es Salaam, *Kirk!*

A specimen collected in Buddu, Uganda, by Dawe (230) differs in having longer calyx-lobes.

57. **S. zanzibarense,** *Vatke in Linnæa*, xliii. 326. A subscandent shrub, 6–7 ft. high. Branches terete, rufous-tomentose when young, ashy when old; spines recurved, compressed, 1 lin. broad, 2–3 lin. long, yellow, hairy at the base. Leaves solitary or geminate, oval-oblong, obtuse, 2 in. long, 1 in. wide, unequal and rounded or slightly acute at the base, sinuately lobed or repand, scaberulous above, paler and stellately tomentose beneath; midrib spiny beneath; primary nerves about 3 pairs, prominent beneath; petiole 5 lin. long; covered with rufous tomentum. Cymes umbellate, 4–7-flowered; peduncles nodding in flower, erect afterwards. Calyx cyathiform, 1 lin. in diam., unarmed, 5-fid; lobes ovate, obtuse, $1\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. wide. Corolla lilac, patent, $\frac{2}{3}$ in. in diam.; lobes 5, oblong-linear, obtuse. Stamens 4 (?), shorter than the corolla-lobes; anthers subsessile, conniving, linear-oblong, pores terminal. Ovary globose; style erect, glabrous, longer than the stamens, slightly curved at the apex; stigma capitate. Berry globose, $\frac{2}{3}$ in. in diam.—Engl. Pfl. Ost-Afr. C. 353.

Mozamb. Dist. Zanzibar: Kidoti, *Hildebrandt*, 988.

58. **S. pharmacum,** *Klotzsch in Peters, Reise Mossamb. Bot.* 234. A much-branched shrub; spines few, recurved. Branches terete, tomentum stellate, deciduous. Leaves oblong, 2 in. long, $\frac{1}{2}$ in. wide, obtuse, slightly attenuate at the base, with yellow stellate pubescence above and whitish tomentum beneath. Cymes racemose, extra-axillary, 3–5-flowered, spiny. Calyx-teeth 5, ovate, short. Corolla funnel-shaped; lobes 5, triangular-ovate, obtuse, stellately tomentose outside and along the midrib inside. Anthers subsessile, oblong, tapering upwards. Style incurved, stellately pilose below; stigma 2-lobed. Berry globose, $\frac{1}{2}$ in. in diam., smooth.—Engl. Pfl. Ost-Afr. C. 354, and Glied. Veg. Usambara, 39, 49.

Mozamb. Dist. German East Africa: Usambara, Nderema, *Holst*, 2236!

Portuguese East Africa: Mozambique, on the island and mainland, *Peters.*

59. **S. glochidiatum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 354. A shrub, 5 ft. high. Branches terete, slender, elongate, densely covered with rusty stellate tomentum; spines recurved, 1 lin. long, compressed, stellately tomentose at the base. Leaves lanceolate or elliptic, repand, 2 in. long, 7–9 lin. wide, green and stellately pubescent above, ochraceous stellate tomentose beneath, spiny on the midrib; petiole 2–4 lin. long. Cymes racemose, extra-axillary, few-flowered; peduncle, pedicels and sometimes the calyx spiny and with minute rusty stellate tomentum; pedicels very slender, $\frac{1}{3}$ in. long, slightly thickened above. Calyx 5-

partite; lobes subulate, 1½ lin. long. Corolla bright blue, 5-partite, ⅔ in. in diam., scarcely plicate; lobes linear-lanceolate, ⅓ in. long, 1 lin. wide, acuminate, rusty tomentose outside the midpetaline areas. Filaments very short; anthers ¼ in. long, attenuate towards the apex. Ovary globose; style filiform, glabrous, ⅓ in. long. Berry ellipsoid, ½ in. long, ⅓ in. in diam.

Mozamb. Dist. German East Africa: Usambara; Masheua, Bumko, *Holst*, 8834.

60. **S. unguiculatum,** *A. Rich. Tent. Fl. Abyss.* ii. 102. A spiny densely tomentose shrub. Branches terete; spines recurved, wide-based. Leaves solitary or geminate, oval, acute or subobtuse, obsoletely sinuate, unequally cordate at the base, with yellowish-green tomentum on both surfaces or sometimes paler beneath, petiolate. Cymes lateral, few-flowered; peduncle long, tomentose; lowest flower alone fertile, on a longer reflexed pedicel. Calyx tomentose, spiny, 5-fid; lobes triangular, acute. Corolla the same size as that of *S. tuberosum*, 5-partite; lobes lanceolate, acute, densely tomentose outside, slightly tomentose within. —Schweinf. Beitr. Fl. Aethiop. 91, and in Verh. Zool.-Bot. Ges. Wien, xv. (1865) 551; Vatke in Linnæa, xliii. 332.

Nile Land. Nubia: Soturba Mountains, *Schweinfurth.* Abyssinia: Shireh Province, *Quartin-Dillon & Petit.*

61. **S. Rohrii,** *C. H. Wright in Kew Bulletin*, 1894, 128. A small shrub. Stem terete, covered with long-rayed stellate hairs; spines numerous, ¼ in. long, straight, compressed. Leaves solitary, lanceolate, 4 in. long, 2 in. wide, slightly undulate, with stellate hairs on both surfaces, those on the upper surface with one ray much longer than the rest. Cymes extra-axillary. Calyx 4-lobed almost to the base, hairy and spiny outside; lobes linear, 2 lin. long. Corolla ⅓ in. in diam., 4-partite, densely white stellate hairy outside; lobes lanceolate. Stamens 4; anthers sessile, slightly shorter than the corolla-lobes, tapering upwards, pores terminal. Ovary globose; style terete, stellately hairy. Berry globose, ½ in. in diam., glabrous, red.

Nile Land. Abyssinia: Ankober, *Roth* (not *Rohr*, as in original description), 445! Somaliland, *Miss Edith Cole!* Uganda: Kavirondo, 4100–6000 ft., *Whyte!*

Mozamb. Dist. British Central Africa: Nyasaland; Mwata Manja stream, *Kirk!*

62. **S. torvum,** *Sw. Prodr. Veg. Ind. Occ.* 47. A shrub, 3–10 ft. high. Branches terete, covered with white stellate tomentum when young; spines compressed, ¼ in. long. Leaves geminate (one much smaller), ovate, 6 in. long, 4 in. wide, more or less pinnately lobed, unequal at the base; petiole 1 in. long, spiny. Cymes extra-axillary, much branched, at first nearly umbellate; pedicels with glandular hairs. Calyx cupular, glandular hairy; segments lanceolate. Corolla rotate, white, 1 in. in diam., stellately hairy outside in bud; lobes 5, ovate-lanceolate. Filaments 1 lin. long; anthers ¼ in. long, linear-lanceolate; pores terminal, small. Ovary globose, glabrous; style longer than the

stamens, curved. Berry globose, $\frac{1}{3}$ in. in diam.—Dunal, Hist. Sol. 203, t. 23, and in DC. Prodr. xiii. i. 260; Wight, Ic. t. 345; Lowther in Journ. Agri.-Hort. Soc. India, xi. (1861) 290; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 234; Kew Bulletin, 1896, 63. *S. stramonifolium*, Roxb. Fl. Ind. i. 572. *S. ferrugineum*, Jacq. Hort. Schoenbr. iii. 46, t. 334. *S. Mannii*, C. H. Wright in Kew Bulletin, 1894, 129.

Upper Guinea. Fernando Po, *Mann*, 55!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 329!

Var. *compactum*, Wright. Leaves less hairy and cymes more congested than in the type.—*S. Mannii*, var. *compactum*, C. H. Wright in Kew Bulletin, 1894, 129; Hiern in Cat. Afr. Pl. Welw. i. 749.

Lower Guinea. Angola: near Ambriz, *Welwitsch*, 6079! *Monteiro!* and various other localities, *Welwitsch*, 6052! 6080! 6082! 6087! 6105!

Throughout the tropics.

63. **S. indicum,** *Linn. Sp. Pl. ed.* i. 187, *partly.* An erect shrub, up to 8 ft. high. Branches terete, densely clothed when young with floccose stellate tomentum; spines straight. Leaves solitary or geminate, ovate or ovate-oblong, more or less sinuately lobed, acute, 4 in. long, 2 in. wide; stellate hairs on the upper surface with one ray much longer than the rest, those on the lower with equal rays. Cymes racemose, few-flowered; pedicels thickened upwards. Calyx shortly campanulate, densely stellately hairy outside; lobes shortly triangular. Corolla violet-purple, $\frac{1}{2}$–$\frac{2}{3}$ in. in diam., densely stellate-hairy outside when young, less so inside; lobes lanceolate, acute. Filaments short; anthers 2 lin. long, lanceolate, pores terminal, minute. Style longer than the anthers. Berries globose, 5 lin. in diam., scarlet, usually several matured on one cyme, glabrous. Seeds compressed, minutely pitted.—Nees in Trans. Linn. Soc. xvii. 55; Wight, Ic. t. 346; Dunal in DC. Prodr. xiii. i. 309; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 234; Hiern in Cat. Afr. Pl. Welw. i. 750; C. H. Wright in Dyer, Fl. Cap. iv. ii. 101; var. *micranthum*, Hook f. in Journ. Linn. Soc. vi. 18. *S. violaceum*, Jacq. Fragm. 82, t. 132, fig. 1.

Upper Guinea. Fernando Po, 4000 ft., *Mann*, 625! Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1322! 1975?

Nile Land. Abyssinia: Begemeder; Gera Abuna Tekla, *Schimper*, 1129! Ankober, *Roth*, 449! Uganda: Mau, 8000 ft., *Scott-Elliot*, 6870! Eldama Ravine, 7000–7500 ft., *Whyte!* Nandi district, *Whyte!* near Lake Elmenteita, 6000 ft., *Scott-Elliot*, 6638!

Lower Guinea. Angola: Huilla; Embala de Lopolla, *Welwitsch*, 6038!

Also extending through India to China and the Philippines.

64. **S. anomalum,** *Thonn. in Schum. & Thonn. Beskr. Guin. Pl.* 126. A shrub. Branches terete, stellately tomentose; spines $\frac{1}{4}$ in. long, recurved or straight from a broad base. Leaves solitary or geminate, ovate-oblong, acute, pinnatifid, stellately hairy on both surfaces, slightly spiny along the midrib; petiole 1 in. long, channelled above, bearing a few spines. Cymes axillary, racemose; flowers pendulous. Calyx 4-toothed, stellately hairy outside. Corolla rotate, 4- (rarely 5-) partite, white, stellately hairy outside; lobes obtuse, concave. Stamens 4; filaments very short; anthers 2 lin. long, pores terminal, small.

Ovary subglobose; style filiform, longer than the anthers. Fruit erect, globose, glabrous, red, 5 lin. in diam.—Dunal in DC. Prodr. xiii. i. 259; Hook. Niger. Fl. 473. *S. umbrosum*, Vahl ex Dunal, l.c.

Upper Guinea. Sierra Leone, *Vogel*, 87! French Guinea: Sulimania, *Scott-Elliot*, 5335b! Liberia: Cape Palmas, *Vogel*, 13! Grand Bassa, *Vogel*, 83! Grant's Farm, Sinoe River, *Whyte!* Northern Nigeria: Nupe, *Barter*, 482! Lagos: Abeokuta, *Harrison*, 3! Fernando Po, *Vogel*, 52! *Mann*, 1165!

Nile Land. Uganda: Busoga villages, *Whyte!* Kampala, *Scott-Elliot*, 7290!

Lower Guinea. Angola: Malange, *Gossweiler*, 1103!

South Central. Congo Free State: Monbuttu; Kussumbo River, *Schweinfurth*, 3175! Niamniam; Assika River, *Schweinfurth*, 3280!

Mozamb. Dist. British Central Africa: Nyasaland; Mount Chiradzulu, *Whyte!*

65. **S. adoënse,** *Hochst. in Flora*, 1841, i. *Intell.* 24. A shrub, 4–5 ft. high. Stem terete, woody, stellately hairy when young, rugose when old; spines $\frac{1}{4}$ in. long, straight, compressed. Leaves solitary or geminate, ovate, pinnately 5–7-lobed, 2 in. long, $1\frac{1}{2}$ in. wide, stellately hairy and spiny on both surfaces, spines more numerous beneath; petiole $\frac{1}{2}$ in. long. Cymes racemose; peduncle 1 in. long; pedicels $\frac{1}{2}$ in. long, erect in flower, pendulous in fruit, clavate, spiny, stellately tomentose. Calyx cyathiform, 5-fid, stellately tomentose and slightly spiny outside; lobes triangular, acute. Corolla white, 5-partite, stellately tomentose outside, glabrous within; lobes lanceolate, $\frac{1}{4}$ in. long. Stamens 5; anthers subsessile, 2 lin. long, subulate, pores small, terminal. Ovary ovoid, glabrous; style filiform, nearly twice as long as the stamens. Fruit globose, 5 lin. in diam., glabrous, orange-red.—Dunal in DC. Prodr. xiii. i. 282; Vatke in Linnæa, xliii. 326; Peters, Reise Mossamb. Bot. 232; Engl. Pfl. Ost-Afr. C. 353. *S. pachycalyx*, Van Heurck & Müll. Arg. in Van Heurck, Obs. Bot. 92.

Nile Land. Abyssinia: near Adowa, *Schimper*, 147! *Franqueville!* Mount Sholoda, *Schimper*, 1855! Eritrea: near Saganeiti, 7000 ft., *Schweinfurth & Riva*, 1758! Goua Gorge, near Addingofou, 7000 ft., *Schweinfurth & Riva*, 1329!

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 872!

66. **S. Carvalhoi,** *Dammer in Engl. Pfl. Ost-Afr. C.* 355. Branches violet, densely covered with rusty stellate tomentum; spines straight, compressed, 2 lin. long. Leaves ovate, repand, acuminate, 4 in. long, nearly 3 in. wide, scabrid with stellate hairs above, more minutely so beneath, slightly spiny on both surfaces; spines straight, compressed, $\frac{1}{3}$ in. long; petiole 1 in. long, stellately pubescent, spiny. Cymes extra-axillary, racemose, short, few-flowered; peduncle, pedicels and calyx very densely stellately hairy. Calyx cupular, 2 lin. in diam.; teeth 5, triangular. Corolla 5-partite; lobes 2 lin. long, $\frac{1}{2}$ lin. wide, linear, stellately hairy outside. Filaments short; anthers elongate, scarcely attenuate towards the apex, 2 lin. long. Ovary globose; style 2 lin. long, filiform, stellately hairy in the lower half. Berry globose, 5 lin. in diam., shining red.

Mozamb. Dist. Portuguese East Africa: Gorongoza, *Carvalho.*

67. **S. schumannianum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 352. Branches woody, terete, erect, densely setose when young, spiny when old. Leaves lanceolate, acuminate, narrowed into the petiole, 4½ in. long, 2 in. wide, covered with minute stellate hairs when young, at length glabrous; petiole about 1 in. long. Inflorescence extra-axillary, paniculate; branches short, bearing umbels of flowers at their apices; peduncle setose; pedicels and calyx pulverulent-tomentose, pedicels ⅓ in. long. Calyx cupshaped, 5-toothed. Corolla rotate; lobes 5–6, linear, 2 lin. long, ½ lin. wide. Filaments very short; anthers 2 lin. long, subulate, pores terminal. Style filiform, ⅓ in. long, stellately tomentose near the base; stigma obliquely bifid.

Mozamb. Dist. German East Africa: Usambara; on the ascent to Magamba Forest, *Holst,* 3841.

68. **S. xanthocarpum,** var. **Schraderi,** *Dunal in DC. Prodr.* xiii. i. 302. A spiny herb. Stem erect, terete, flexuose, branched, slightly stellately hairy when young; spines short, straight, subulate. Leaves oblong or oblong-lanceolate, pinnately 5–9-lobed, up to 5 by 3 in., with minute distant stellate hairs on both surfaces, and spines on the upper side of the midrib; petiole 1 in. long, spiny. Cymes extra-axillary, 5–8-flowered. Calyx ovoid, sparingly stellate-hairy outside; lobes ovate, acuminate. Corolla about 1 in. in diam., blue-purple, densely stellate-hairy outside the midpetaline areas, slightly hairy inside. Stamens 5, equal; filaments very short, broad; anthers ¼ in. long, oblong, pores terminal. Ovary subglobose, hirsute; style thickened above, curved at the apex. Berry globose, size of a cherry, shining yellow.—Schweinf. Pl. Nilot. 25, t. 9. See note in Hook. f. Fl. Brit. Ind. iv. 236.

Nile Land. Senaar, ex *Schweinfurth.* Gallabat, *Schweinfurth,* 1365! Fashoda, *Schweinfurth,* 1081! Kordofan: Abu Haraza and Abu Felagi, *Pfund,* 149! Mulbes, *Pfund,* 661! Bahr el Gebel, at Kanissa, *Muriel,* S, 77! Banks of the White Nile, *Petherick!* Niamniam: Nabambisso River, *Schweinfurth,* 3094!

69. **S. Thruppii,** *C. H. Wright in Kew Bulletin,* 1894, 129. Stem erect, terete, sparingly furnished with stellate hairs; spines straight, compressed, ⅓ in. long. Leaves solitary, ovate, sinuately 7–9-lobed, unequal and acute at the base, 5 by 4 in., stellately hairy on both surfaces and spiny on the principal veins; petiole 2–3 in. long, channelled above, spiny. Cymes corymbose, much shorter than the leaves. Calyx campanulate, ½ in. in diam., stellately hairy, spiny; lobes 5, ovate, acuminate. Corolla rotate, purple, 1¼ in. in diam., densely stellately hairy outside the midpetaline areas, glabrescent within; lobes 5, elliptic, ⅓ in. long, 2 lin. wide. Stamens 5; anthers subsessile, oblong, ¼ in. long, pores oblique. Ovary ovoid, hairy above; style rather longer than the stamens.

Nile Land. Somaliland: Hahi, Boobi and Adda Galla, *James & Thrupp!*

70. **S. acanthocalyx,** *Klotzsch in Peters, Reise Mossamb. Bot.* 232. A shrub 2–6 ft. high. Branches terete, stellately hairy; spines

numerous, short, recurved, compressed. Leaves solitary, ovate, pinnately lobed, cordate or acute at the base, 3 in. long, 2 in. broad, stellately hairy and with short curved spines on the chief veins on both surfaces; petiole 1 in. long, densely beset with short recurved spines. Cymes few-flowered, leaf-opposed. Calyx campanulate, clothed with stellate hairs, and numerous small spines at the base; lobes 5, broadly triangular. Corolla campanulate, 2 in. in diam., stellately hairy outside and along the midrib inside; lobes 5, ovate-lanceolate, acute, 1 in. long, ½ in. wide. Stamens 5; filaments short; anthers lanceolate, ½ in. long, pores terminal, small. Ovary globose, stellately hairy; style 1 in. long, thickened and curved above.—Engl. Pfl. Ost-Afr. C. 353.

Mozamb. Dist. Portuguese East Africa: Anjoana Island, *Peters*. British Central Africa: Nyasaland; Blantyre, *Buchanan*, 36! *Scott!* Mount Mlanji *Whyte!* Tanganyika-Moero Plateau, *Carson*, 30! Zomba and vicinity, *Whyte*; 2800–3500 ft., *Whyte!* and without precise locality, *Buchanan*, 494!

Also in Madagascar.

71. **S. marginatum,** *Linn. f. Suppl.* 147. A shrub, 3–4 ft. high. Stem terete, covered with white stellate tomentum; spines subulate, 1 in. long. Leaves ovate, pinnately lobed less than half-way to the midrib, subcordate at the base, coriaceous, 3–7 in. long, 2–5 in. wide, covered with fine white stellate pubescence which in age disappears from the upper surface except near the margin, spines on the principal veins often 1 in. long. Cymes extra-axillary, subumbellate; pedicels, outside of calyx and corolla covered with white stellate tomentum. Calyx campanulate, 4 lin. long, 5-fid, spiny; lobes narrow, acute. Corolla broadly campanulate, 1¼ in. in diam., white, centre and midrib pink. Stamens 5; filaments very short; anthers ¼ in. long, pores terminal. Fruit globose, 1½ in. in diam., shining yellow.—Jacq. Collect. i. 50, and Ic. t. 45; Murr. Comm. Gotting. vi. (1783), t. 4; Dunal, Hist. Solan. 215, t. 3, fig. A, and in DC. Prodr. xiii. i. 370; Bot. Mag. t. 1928; Vatke in Linnæa, xliii. 332. *S. abyssinicum*, Jacq. ex Vitm. Summa Pl. i. 492. *S. niveum*, All. ex Vitm. l. c.

Nile Land. Abyssinia: near Adowa, *Schimper*, 181! Samen; Genausa, *Schimper*, 1316! Chelicut, *Petit*, 228! Eritrea: Saganeiti, *Schweinfurth & Riva*, 830! Hamasen; Sasega, *Steudner*, 716!

72. **S. dubium,** *Fresen. Mus. Senck.* i. 166. Shrubby. Branches flexuose, spiny or unarmed, clothed with whitish leprose tomentum. Leaves long petioled, the upper geminate unequally cordate, ovate or ovate-lanceolate, repand-sinuate, acuminate or obtuse, with adpressed stellate tomentum on both surfaces, pale green above, white beneath, 4 by 2 in. Cymes short, few-flowered. Calyx cyathiform or campanulate, ¼ in. in diam., spiny. Corolla violet, stellately hairy outside, plicate, 5-fid; lobes ovate-lanceolate, acute, reflexed. Stamens 5, one longer than the rest; anthers oblong, obtuse, pore terminal. Ovary globose, hirsute at the apex; style thickened upwards, declinate. Berry globose, ¼–⅓ in. in diam., yellow, nearly covered by the inflated

spiny calyx.—Dunal in DC. Prodr. xiii. i. 332 (incl. var. *longipetiolatum*, sub-vars. *aculeatum* and *subinerme*), not of Hist. Solan. 240; A. Rich. Tent. Fl. Abyss. ii. 104; Schweinf. Pl. Nilot. 24, t. 8, and in Verh. Zool.-Bot. Ges. Wien, xv. (1865) 551; Vatke in Linnæa, xliii. 331; Zarb in Cat. Spéc. Bot. Pfund, 31; Terracc. in Ann. Istit. Bot. Roma, v. 103.

Nile Land. Nubia: by the Nile between Shendy and Berber, *Bromfield*, 127! Soturba Mountains, *Schweinfurth*, 1377! 1378! Coast region, *Lord! Bent!* Sudan: Khartoum, *Kotschy*, 344, *Broun!* Kordofan: Abu Gerad, *Kotschy*, 39! Bareus, *Pfund*, 473! Jebel Kurbag, *Pfund*, 356! Kagmar, *Pfund*, 104, Sigei, *Pfund*, 248! Darfur: Gebel Barkiu, *Pfund*, 652! Sennar, *Kotschy*, 263! Eritrea: Shoho, *Quartin Dillon, Rüppell.*

Also in Arabia.

Dunal's two subvarieties are connected by Pfund, 473.

73. **S. Fischeri,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353. Stem covered with rusty stellate tomentum; spines few, straight, 2 lin. long, compressed, pale yellow, stellately tomentose at the base. Leaves lanceolate, sinuate-repand, acuminate, oblique at the base, 5 in. long, 1½ in. wide, stellately tomentose on both surfaces; petiole 7–10 lin. long, channelled above, bearing a few short spines. Cymes extra-axillary, racemose; peduncle and pedicels stellately tomentose, more or less spiny. Calyx 5-partite, stellately tomentose, spiny; lobes subulate. Corolla rotate, rather more than 1 in. in diam., lilac, plicate, 5-fid; lobes triangular-lanceolate, stellately tomentose outside the midpetaline areas. Filaments short; anthers equal, ⅓ in. long, slightly tapering towards the apex. Style a little longer than the stamens, stellately tomentose beyond the middle. Berry globose, 10 lin. in diam., slightly exserted from the enlarged calyx.

Mozamb. Dist. German East Africa: Kageyi on Lake Victoria, *Fischer*, 406.

74. **S. obliquum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 354. Stem slender, terete, minutely stellate pubescent; spines few, straight, compressed, 1 lin. long, hairy in the lower half. Leaves ovate-lanceolate, slightly sinuous, very unequal at the base, 3½ in. long, 1½ in. wide; upper surface green and with minute scabrid stellate hairs; under-surface ashy-grey with stellate hairs; petiole 7 lin. long, here and there spiny. Cymes extra-axillary, racemose, many-flowered; peduncle, pedicels and outside of calyx densely stellately pubescent. Calyx cupular; lobes 5, oblong-lanceolate, 2 lin. long, 1 lin. wide. Corolla rotate, plicate, about 1 in. in diam.; lobes 5, acute, stellately pubescent outside the midpetaline areas. Filaments very short; anthers ⅓ in. long, pores terminal. Ovary globose; style clavate, ⅔ in. long, stellately hairy in the lower half; stigma oblique. Berry globose, ⅓ in. in diam.

Mozamb. Dist. German East Africa: Dar-es-Salaam, *Stuhlmann*, 7576.

75. **S. urbanianum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 355. A shrub. Branches slender, terete, covered with very minute stellate

hairs; spines few, straight, much flattened, very short. Leaves lanceolate, 6 in. long, 1½ in. wide, tapering downwards, scrobiculate and stellately hairy above, scabrid with very minute stellate hairs beneath; petiole 7 lin. long, stellately hairy and slightly shiny. Cymes extra-axillary, racemose; peduncle, pedicels and calyx furnished with minute stellate hairs. Calyx ¼ in. in diam., cupular; teeth 6, subulate. Corolla rotate, plicate, 6-lobed, about 1½ in. in diam., stellately hairy outside the midpetaline areas. Stamens 6; filaments short; anthers ⅓ in. long, tapering to the apex, pores terminal. Ovary globose; style filiform, curved at the clavate apex; stigma oblique.

Mozamb. Dist. Portuguese East Africa: Gorongoza, *Carvalho*.

76. **S. tomentellum,** *Klotzsch in Peters, Reise Mossamb. Bot.* 236. A branched tomentose shrub, unarmed or with a few short spines. Branches terete, with evanescent stellate pubescence. Leaves oblong, subacute, 3–6 in. long, ¾–1½ in. wide, stellately tomentose on both surfaces, rarely spiny near the base; petiole 4–5 lin. long. Cymes racemose, extra-axillary near the ends of the branches, few-flowered. Calyx cyathiform, deeply 5-toothed; teeth ovate-lanceolate, acute, stellately tomentose. Corolla funnel-shaped, 1 in. in diam.; lobes 5, acute, subpatent, pubescent outside. Anthers subsessile, pallid, slightly tapering upwards. Style very short, covered with simple hairs. Berry globose, light yellow, ¾ in. in diam.—Engl. Pfl. Ost-Afr. C. 355.

Mozamb. Dist. Portuguese East Africa: On the mainland and island of Mozambique, *Peters*, Rios de Sena and Querimba (Kerimba) Islands, *Peters*.

77. **S. trepidans,** *C. H. Wright in Kew Bulletin*, 1894, 128. Suffruticose. Stem terete, 1–3 ft. high, covered by compact stellate tomentum; spines 2 lin. long, compressed. Leaves solitary, lanceolate, 4 in. long, 1 in. wide, sinuate, acute at the base, stellately hairy on both surfaces, spiny on the midrib. Cymes near the apex of the branches, few-flowered. Calyx campanulate, 2 lin. long, covered with stellate hairs outside; lobes 5, short, triangular, acute. Corolla 4–6 times as long as the calyx, 1 in. in diam., broadly campanulate, membranous, stellately hairy outside; lobes 5, pale lilac, midribs white, broadly triangular, acute. Stamens 5; filaments very short; anthers ¼ in. long, oblong, obtuse, pore terminal. Ovary subglobose, stellately hairy at the apex.—*S. astrochlænoides*, Dammer in Engl. Jahrb. xxviii. 476.

Mozamb. Dist. German East Africa: Usagara; foot of Vidunda Mountains, near the River Ruhembe, 2300 ft., *Goetze*, 384a! British Central Africa: Nyasaland; Shire Valley, near Bishop Mackenzie's grave, *Scott!* Shire and Shupanga, *Stewart!* Zomba and vicinity, 2500–3500 ft., *Whyte!* Kondowe to Karonga, 2000–6000 ft., *Whyte!* Songue to Karonga, 1700–2000 ft., *Whyte*, 4!

78. **S. englerianum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353. A shrub, 3–5 ft. high. Branches terete, pulverulent with rusty stellate hairs at the apex, bases only of the hairs persistent, spiny; spines very short, much compressed, recurved, glabrous at the base. Leaves 3½ in. long, 1⅓ in. wide, lanceolate, sometimes oblique at the base; upper

surface green, scabrid with very minute stellate hairs and bearing scattered spines 1 lin. long; lower surface with rusty stellate pubescence, sometimes spiny; margin sometimes slightly sinuate; petiole short, with stellate pubescence and scattered spines. Cymes racemose, at first apparently terminal, few-flowered; peduncle and pedicels unarmed, clothed with rusty stellate hairs; pedicels slender, 1 in. long. Calyx cupular, 5-toothed; teeth 2 lin. long. Corolla pale blue, rotate, plicate, 5-partite, 14 lin. in diam.; lobes lanceolate, acute, stellately hairy outside the midpetaline areas. Filaments very short; anthers elongate, attenuate upwards. Ovary globose; style 5 lin. long, filiform, glandular hairy below. Berry ellipsoid, 7 lin. long, 5 lin. in diam., yellow?

Mozamb. Dist. German East Africa: Usambara; Nderema, *Holst*, 2231, Gonja, *Holst*, 4231.

79. **S. incanum,** *Linn. Sp. Pl. ed.* 1, 188. A shrub 3–5 ft. high, with dense stellate tomentum on the branches, petioles, underside of leaves and outside of calyx and corolla. Branches terete; spines few or many, 2 lin. long, curved, broad at the base. Leaves ovate or ovate-elliptic, sinuate, 5 by 2–3 in., obtuse, green and minutely stellately hairy on the upper surface, unequal at the base, sometimes spiny on the midrib and nerves; petiole 15 lin. long. Flowers solitary or few together (the lower only fertile), cernuous; peduncle short. Calyx spiny outside, cup-shaped; lobes lanceolate, acuminate. Corolla purple or white, $\frac{3}{4}$–$1\frac{1}{4}$ in. in diam.; lobes ovate, acute. Filaments very short; anthers $2\frac{1}{2}$ lin. long, oblong, pores small, terminal. Style longer than the stamens. Fruit subglobose, $1\frac{1}{2}$ in. in diam., yellow.—C. H. Wright in Dyer, Fl. Cap. iv. ii. 101. *S. coagulans*, Forsk. Fl. Ægypt.-Arab. 47; Del. Fl. Égypte, 63, t. 23, fig. 7; Schenk, Pl. Sp. Ægypt. 24; Boiss. Fl. Orient. iv. 286; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 236; var. *griseum*, Dunal in DC. Prodr. xiii. i. 369. *S. sanctum*, Linn. Sp. Pl. ed. 2, 269. *S. esculentum*, Drège, Zwei Pflanzengeogr. Documente, 49, 138, 139, 151, not of Dunal. *S. subexarmatum*, Dunal, l.c. 367. *S. Melongena*, C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 235, partly, not of Linn.

Upper Guinea. Northern Nigeria: Jeba on the Kworra (Niger), *Barter!*

Nile Land. Nubia: *Schweinfurth*, 1388! *Bent!* Kordofan, *Kotschy*, 454! Obeid, *Pfund*, 8! Darfur, *Pfund*, 106! Sennar, *Kotschy*, 231! Blue Nile, near Masheika, *Muriel*, S 31! Eritrea: near Acrur, *Schweinfurth & Riva*, 1343! near Ailet, *Schweinfurth & Riva*, 445! Abyssinia: near Jelajeranne, *Schimper*, 1574! Somaliland: Golis Range, *Miss Edith Cole!* Jur: Jur Ghattas, *Schweinfurth*, iii, 89! Uganda: Busoga villages, *Whyte!* 5th march from Lubwas, *Whyte!* Kavirondo, *Whyte!* British East Africa: Kikuyn, *Whyte!* near Nairobi, *Whyte!* Makindu River, *Kässner*, 580!

Lower Guinea. Angola: Benguela, *Curror*, 12!

Mozamb. Dist. German East Africa: Usambara, *Buchwald*, 93! British Central Africa: Ngamiland, Kwebe Hills, *Mrs. Lugard*, 18!

Also in South Africa and extending through Arabia to Scinde and the Punjaub.

An almost glabrous form of this was collected at Gallabat by Schweinfurth (1365!) and in Kordofan by Pfund (149!).

80. **S. chrysotrichum,** *C. H. Wright in Kew Bulletin*, 1894, 129. A shrub. Stem densely covered with yellow stellate floccose tomentum; spines few, short, almost concealed by the tomentum. Leaves ovate, acute, pinnately 7–9-lobed, 5 in. long, 3–4 in. broad, densely stellately tomentose on both surfaces, with a few short spines on the midrib; petiole 1 in. long. Inflorescence cymose. Calyx $\frac{1}{2}$ in. long; tube campanulate, beset with numerous small spines. Corolla broadly campanulate, purple, 1 in. in diam.; lobes 5, ovate, shortly acuminate, densely tomentose outside and on the midrib inside, $\frac{1}{2}$ in. long. Stamens 5; filaments short; anthers $\frac{1}{4}$ in. long, obtuse, pores terminal, small. Ovary globose; style filiform, nearly as long as the corolla-lobes.

Mozamb. Dist. British Central Africa: Nyasaland; Zomba Plain, 2500 ft., *Whyte!* Plateau of Zomba, 5000–6000 ft. *Whyte!* and without precise locality, *Buchanan*, 494 bis! 776!

81. **S. campylacanthum,** *Hochst. in Flora*, 1841, i. *Intellig.* 24. Stem woody, 2–5 ft. high, branched, cylindrical, stellately tomentose; spines short, recurved. Leaves solitary, from broadly lanceolate to oval, entire or slightly sinuate, up to 6 by $2\frac{1}{2}$ in., stellately hairy on both surfaces, spiny on the midrib. Cymes extra-axillary, few-flowered. Calyx cyathiform-campanulate; lobes 5, subulate. Corolla campanulate, lilac (*Wilson*), 1 in. in diam.; lobes 5, broadly triangular, densely stellately hairy outside and on the midrib inside. Stamens 5; anthers subsessile, $\frac{1}{3}$ in. long, pores small, terminal. Ovary globose, stellately hairy at the apex; style subulate, as long as the anthers, stellately tomentose. Berry globose, 1 in. in diam. on a reflexed pedicel.—Dunal in DC. Prodr. xiii. i. 336; Engl. Glied. Veg. Usambara, 22.

Nile Land. Abyssinia: near Adowa, *Schimper*, 123! 1082! and without precise locality, *Schimper*, 1921! *Quartin Dillon & Petit*, 230! Eritrea: Keren, 4500 ft., *Beccari*, 168! Saganeiti, 7000 ft. *Schweinfurth & Riva*, 843! Uganda: Eldama Ravine, 7500 ft., *Whyte!* and without precise locality, *Wilson*, 96.

Mozamb. Dist. German East Africa: Uniamwezi; near Tabora, *Speke & Grant!* Usambara; Amboni, *Holst*, 2678! Portuguese East Africa: near Lake Nyasa, *Johnson*, 437!

The roots and fruit of this species are mixed with hot milk and drunk. *H. C. Hollis, Masai Customs*, 336.

82. **S. phoricum,** *Klotzsch in Peters, Reise Mossamb. Bot.* 234. Stem 2–3 ft. high. Branches terete, covered with stellate tomentum; spines straight, yellow. Leaves oblong, obtuse, 3–5 in. long, 8–10 lin. wide, tapering into the petiole, stellately tomentose above, griseo-tomentose beneath; nerves and petiole spiny. Cymes extra-axillary, racemose, shorter than the leaves, few-flowered. Calyx deeply 5-lobed, covered with stellate hairs; lobes lanceolate-subulate, obtuse. Corolla deeply 5-lobed, twice as long as the calyx, stellately hairy outside; lobes ovate-oblong, obtuse, 5 lin. long, 3 lin. wide. Anthers subsessile, yellow, tapering upwards. Style very short, villous below.—Engl. Pfl. Ost-Afr. C. 355.

Mozamb. Dist. Portuguese East Africa: Rios de Sena and many other parts of the province, *Peters*.

83. **S. magnusianum,** *Dammer in Engl. Jahrb.* xxviii. 475. A shrub about 3 ft. high. Branches flexuous, at first stellately tomentose, at length glabrescent; spines compressed, recurved. Leaves ovate, repand, often oblique at the base, green and minutely stellately scabrid above, paler and densely stellately tomentose beneath, up to 4 in. long and 2 in. wide; petiole 10 lin. long, often spiny. Cymes racemose; pedicels and calyx of the fertile flower usually spiny, of the sterile usually unarmed. Calyx stellately tomentose outside; lobes lanceolate, acute. Corolla ultramarine, up to $1\frac{3}{4}$ in. in diam., stellately tomentose outside and on the midribs inside; lobes 5, broadly lanceolate. Stamens 5; filaments very short; anthers 5 lin. long, lanceolate, terminal pores small. Ovary globose; style $\frac{3}{4}$ in. long, stellately hairy; stigma 2-lobed. Fruit globose, $1\frac{3}{4}$ in. in diam., orange-yellow, seated on the persistent spiny calyx; pedicel incrassate. Seeds reniform, tuberculate.

Mozamb. Dist. German East Africa: Usagara; at the foot of the Vidunda Mountains near Kidodi, *Goetze*, 384!

84. **S. bathocladon,** *Dammer in Engl. Jahrb.* xxviii. 476. Branches stellately tomentose, at length nearly glabrous; spines recurved, 1–$1\frac{1}{2}$ lin. long. Leaves ovate, repand or sinuate, 4 in. long, $2\frac{1}{3}$ in. broad, scabrid with stellate hairs above, paler and densely tomentose beneath, with straight spines on both surfaces; petiole about 1 in. long, with many recurved spines. Cymes extra-axillary, racemose, few-flowered, $1\frac{1}{2}$ in. long; peduncle and pedicels spiny, densely stellate-tomentose. Calyx 4–5-fid, stellate-tomentose and densely spiny outside; lobes $\frac{1}{3}$ in. long, lanceolate. Corolla rotate, violet, plicate, $1\frac{1}{2}$ in. in diam.; lobes 4–5, broadly ovate, mucronate, densely stellate-tomentose outside. Stamens 4–5, equal; filaments glabrous, $\frac{1}{2}$ lin. long; anthers yellow, 5 lin. long, tapering towards the apex. Ovary conical, glabrous; style 7 lin. long, stellate-pilose; stigma 2-lobed.

Mozamb. Dist. German East Africa: East Uluguru; in deserted fields near Lussegwa, 1600 ft., *Stuhlmann*, 8731!

85. **S. Bojeri,** *Dunal in DC. Prodr.* xiii. i. 344. Branches terete, covered with pale yellow stellate hairs, unarmed or with a few recurved compressed spines. Leaves ovate-lanceolate, acuminate, subcordate at the base, 4–6 in. long, about 2 in. wide, entire or subrepand, stellately hairy on both surfaces, yellowish-green above, paler beneath; petiole 7–8 lin. long. Cymes racemose, simple or bifid; flowers large, fragrant, lowest alone fertile, the other 4–5 male; peduncle, pedicels, outside of calyx and corolla covered with pale yellow stellate tomentum. Calyx broadly campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. in diam., unarmed in the sterile flowers; lobes 5, ovate-cuneate, cuspidate. Corolla 1 in. in diam., lilac, plicate; lobes 5, ovate-lanceolate, acute, reflexed, hairy on the midrib inside. Stamens 5, equal, $\frac{1}{4}$–$\frac{1}{3}$ in. long; filaments dilated at the base, subcomplanate, up to 1 lin. long; anthers oblong-linear, $\frac{1}{4}$ in. long, dull yellow. Ovary ovoid, clothed with rusty tomentum; style declinate, subterete, tomentose except at the apex; stigma capitate. Berry

depressed, globose, yellow, glabrous, size of a pigeon's egg.—Klotzsch in Peters, Reise Mossamb. Bot. 235 ; Engl. Pfl. Ost-Afr. C. 355. *S. suaveolens*, Boj. Hort. Maurit. 239, partly, not of Kunth & Bouché.

Mozamb. Dist. Zanzibar, *Peters*. German East Africa : several localities, *ex Engler*.

Var. *sinuato-repandum*, Dunal, l.c. 345. Branches fuscous, naked at the base. Leaves lanceolate, sinuate-repand. Racemes 2-fid ; flowers many, crowded. Style glabrous.—Klotzsch, l.c. 235. *S. suaveolens*, Bojer, l.c., partly.

Mozamb. Dist. German East Africa : Usambara, *ex Engler*, Portuguese East Africa : Lower Zambesi at Tete, and on the mainland and island of Mozambique, *Peters*.

Also in the Mascarene Islands.

86. **S. monotanthum,** *Dammer in Engl. Jahrb.* xxviii. 474. A shrub, about 3 ft. high. Branches elongated, densely stellate-tomentose, spines compressed, recurved. Leaves ovate, undulate-repand, 6 in. long, $2\frac{1}{2}$ in. broad, scabrid on both surfaces, green above, paler and spiny on the midrib beneath ; petiole $1\frac{1}{2}$ in. long. Inflorescence extra-axillary, racemose ; lowest flower in the axil of the raceme ; rhachis densely stellate-pilose ; lowest pedicel spiny, the rest unarmed, up to $\frac{1}{3}$ in. long. Calyx cup-shaped, angled ; teeth 4, subulate. Corolla violet, 1 in. in diam. ; lobes 4, long ovate-lanceolate, stellately hairy outside. Stamens 4 ; filaments short, glabrous ; anthers $\frac{1}{3}$ in. long, tapering upwards. Ovary globose, glabrous ; style a little longer than the stamens. Fruit 5 lin. in diam. Seeds reniform, tuberculate.

Mozamb. Dist. German East Africa : Khutu Steppe, *Goetze*, 113.

87. **S. hybridum,** *Jacq. Hort. Vind.* ii. 51, *t.* 113. A branched shrub, 2–5 ft. high. Stem terete, glabrous ; spines small, distant, compressed ; branches tomentose. Leaves geminate, ovate, acute, sinuate or entire, 3 in. long, 2 in. wide, stellately tomentose on both surfaces, petioled. Cymes racemose, umbellate or reduced to a single flower. Calyx tomentose ; tube spiny ; lobes linear-lanceolate. Corolla 1 in. in diam., pale purple, 5-fid ; lobes broadly triangular. Stamens half as long as the corolla-lobes. Berry pendulous, subrotund, 1 in. in diam., orange-red.—Dunal in DC. Prodr. xiii. i. 298.

Guinea. *Ex Dunal.*

Nile Land. Gallabat : near Hammad, *Schweinfurth*, 1387 !

88. **S. cerasiferum,** *Dunal in DC. Prodr.* xiii. i. 365. Stem branched, cylindrical, minutely stellately hairy ; spines generally straight. Leaves oblong, acute, $2\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. wide, pinnately lobed, furnished with minute stellate hairs and a few rigid spines on both surfaces. Cymes racemose. Calyx campanulate, 10-ribbed, densely stellately hairy, sparingly spiny ; lobes 5, ovate-lanceolate. Corolla campanulate, $\frac{3}{4}$ in. in diam., violet, densely stellately hairy outside ; lobes 5, lanceolate, acute. Stamens 5 ; anthers $\frac{1}{4}$ in. long, subsessile. Ovary subglobose, hairy at the apex ; style terete, elongate, covered with stellate hairs. Berry yellow.—Engl. Pfl. Ost-Afr. C. 356.

Nile Land. Sennar, *Acerbi, ex Dunal.*

Mozamb. Dist. Zanzibar, *Hildebrandt*, 987!

Var. *cinereo-tomentosum*, Dunal, l.c. Branches, undersurface of leaves, peduncles, pedicels and outside of calyx and corolla ashy-grey tomentose.

Nile Land. Sennar, *Kotschy*, 333!

89. **S. antidotum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 355. A shrub. Branches terete, densely covered with stellate hairs; spines straight, compressed, hairy at the base, Leaves ovate, slightly sinuate, obtuse, mucronate, about 2 in. long, 1½ in. wide, densely stellately tomentose on both surfaces; nerves very prominent below, shortly spiny; petiole 5 lin. long, stellately tomentose, spiny. Calyx cupular; teeth 5, triangular-lanceolate, 1½ lin. long. Corolla rotate, 10 lin. in diam., deeply 5-lobed; lobes ⅓ in. long, 2 lin. wide, oblong-oval, densely covered with minute stellate hairs outside. Filaments very short; anthers ¼ in. long, slightly attenuate towards the apex. Ovary subglobose; style stellately tomentose at the base.

Mozamb. Dist. German East Africa: Pare Moëta, *Fischer*, 314.

90. **S. Melongena,** *Linn. Sp. Pl. ed.* i. 186. A robust herb or almost a shrub, spiny. Branches terete, usually dark purple, clothed with sessile stellate hairs. Leaves ovate, repand or sinuate, acuminate, unequal at the base, 6–9 in. long, 3–5 in. wide, stellately tomentose on both surfaces, unarmed, rarely spiny; petiole 1 in. long, spiny. Flowers solitary, or few in a cyme with the lowest alone fertile, 5–9-merous. Calyx often spiny, ⅓ in. in diam., enlarging in fruit; lobes unequal, linear-lanceolate. Corolla violet-purple, 1–1½ in. in diam., stellately hairy on both surfaces; lobes 4–5 lin. long, triangular, acute. Filaments short; anthers ¼–⅓ in. long, oblong or oblong-lanceolate, pores apical, small. Style 2–3 lin. long, slightly curved, stellately hairy at the base. Berry oblong or slightly enlarged above, 6 in. long, blackish-purple; placentas fleshy.—Nees in Trans. Linn. Soc. xvii. 48; Sendtn. in Mart. Fl. Bras. x. 77; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 235 partly; Duthie, Field & Gard. Crops, iii. 31, t. 95; Hiern in Cat. Afr. Pl. Welw. i. 748; C. H. Wright in Dyer, Fl. Cap. iv. ii. 99; Baum, Kunene-Samb. Exped. 496. *S. esculentum*, Dunal, Hist. Solan. 208, t. 3; and in DC. Prodr. xiii. i. 355; Engl. Glied. Veg. Usambara, 22, and Pfl. Ost-Afr. C. 355. *S. edule*, Schumach. & Thonn. Beskr. Guin. Pl. 125; Ficalho, Pl. Uteis, 231; Engl. Pfl. Ost-Afr. C. 355.

Upper Guinea. Lagos, *Rowland!* Northern Nigeria; Kuka, *Vogel*, 28!

Nile Land. Somali Land, *Mrs. Lort Phillips!*

Lower Guinea. Angola: near Pemba and near the River Lucala, *Welwitsch*, 6083! near Ngombe, *Welwitsch*, 6084! German South-west Africa: Hereroland, *Luderitz*, 13!

Mozamb. Dist. Zanzibar, *Peters.* German East Africa: Rovuma River, *Kirk!*

Var. *inerme*, Hiern, l.c. Stem woody, unarmed. Stamens 6. Ovary globose, 4-celled.—*S. esculentum*, var. *inerme*, Dunal in DC. Prodr. xiii. i. 355; Baum, Kunene Samb. Exped. 361, 443.

Upper Guinea. Sierra Leone, *Vogel*, 52! North-east from Sierra Leone, *Garrett*, 22! Togo: near Lome, *Warnecke*, 351!

Lower Guinea. Angola: near Sange, *Welwitsch*, 6091! by the River Cuango, *Welwitsch*, 6092! by the River Luinha in Queta, *Welwitsch*, 6093! Banza do Sobato Bango, *Welwitsch*, 6094! by the Quiriri River above Sakkemecho, 3900 ft., *Baum*, 725!

Mozamb. Dist. German East Africa: Usambara; Amboni, *Holst*, 2829!

91. **S. kitivuense,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353 Branches slender, terete, stellately tomentose; spines straight or slightly reflexed, 1 in. long. Leaves ovate, oval or lanceolate, obtuse or acute, sinuate-repand, $2\frac{1}{2}$ in. long, $1\frac{1}{2}$ in. wide, green and stellately pubescent above, rusty stellate-tomentose beneath, more or less spiny on both surfaces; petiole 7 lin. long, spiny, stellate-tomentose. Racemes extra-axillary; peduncle and pedicels stellate-tomentose, spiny here and there. Calyx cupular, stellate-tomentose outside, 5-partite; lobes 2 lin. long, subulate. Corolla rotate, 10 lin. in diam., stellate-tomentose outside; lobes linear, acute, 5 lin. long, 1 lin. wide. Filaments short; anthers $\frac{1}{4}$ in. long, tapering to the apex. Ovary subglobose, glabrous; style glabrous, 5 lin. long; stigma oblique, bifid. Immature berry ellipsoid.

Mozamb. Dist. German East Africa: Usaramo; Bunbe, *Stuhlmann*, 7026; Usambara; Kitivu, *Holst*, 276.

92. **S. aculeastrum,** *Dunal in DC. Prodr.* xiii. i. 366. A shrub, 7–15 ft. high; stem terete, with short dense white stellate tomentum on the younger parts; spines very large, $\frac{3}{4}$ in. long, compressed, recurved. Leaves geminate or ternate, green above, with dense white stellate tomentum beneath and spines on the midrib. Cymes extra-axillary, racemose, lowest flower alone fertile. Calyx cupular, 5-fid, enlarged in fruit; lobes 2 lin. long, spiny and covered with stellate tomentum outside. Corolla rotate, 5-lobed; lobes linear, 1-nerved, $\frac{1}{2}$ in. long, 1 lin. broad, white or yellowish, stellately hairy outside, glabrous within. Stamens 5; filaments very short; anthers $\frac{1}{4}$ in. long, pores terminal, small. Ovary globose, stellately hairy; style short. Berry globose, 2 in. in diam., smooth, yellow.—C. H. Wright in Dyer, Fl. Cap. iv. ii. 95. *S. sodomæum*, Drège, Zwei Pflanzengeogr. Documente, 147, not of Linn.

Mozamb. Dist. Uganda: Nandi, 7000 ft., *Scott-Elliot*, 6977! between Nandi and Kakamagas, 4000–4500 ft., *Whyte!* Ruwenzori forest, 8000 ft., *Scott-Elliot*, 7778! British Central Africa: Nyasaland; Blantyre, *Scott*! Shire Highlands, *Buchanan*, 138! Mount Sochi, *Meller*, 5! forest between Lake Shirwa and Lake Chiuta, *Cunningham*, 25!

"The natives eat the outer part of the fruit, which, when ripe, is yellow and hard. The inner portion is dreadfully bitter."—*Buchanan*.

Also in South Africa.

93. **S. duplosinuatum,** *Klotzsch in Peters, Reise Mossamb. Bot.* 233. A shrub, about 3 ft. high. Stem covered when young with stellate

hairs; spines straight, ¼ in. long. Leaves subsessile, bi- to tri-pinnatifid, 8 in. long, 5 in. broad, with straight spines ½ in. long on both surfaces of the principal veins, upper surface with simple straight hairs, under surface with stellate hairs. Cymes racemose, few-flowered; flowers 5-merous. Calyx campanulate, spiny, clothed with long-rayed stellate hairs; lobes lanceolate-subulate. Corolla mauve, broadly campanulate, about 1½ in. in diam. Filaments very short; anthers ¼ in. long, oblong, attenuate, pores terminal, small. Ovary globose; style as long as the stamens. Fruit globose, 1½ in. in diam., white in the upper third. green at the base, with many green branching lines from base to apex. —Oliv. in Trans. Linn. Soc. xxix. 118; Engl. Pfl. Ost-Afr. C. 354, and Glied. Veg. Usambara, 18; Medley Wood, Natal Plants, i. 39, t. 49; Hiern in Cat. Afr. Pl. Welw. i. 750; C. H. Wright in Dyer, Fl. Cap. iv. ii. 98. *Solanum* no. 3, R. Br. in Speke, Nile, Append. 641. *S. Farini*, Dammann in Wien. Ill. Gartz. 1896, 405, fig. 59. *S. Kilimandschari*, Dammer in Engl. Pfl. Ost-Afr. C. 352.

Upper Guinea. Lagos, *Rowland! Dawodu*, 37! Gambia, *Brown-Lester*, 3! Abeokuta, *Harrison*, 23!

Nile Land. Abyssinia: Begemeder, *Schimper*, 1404! Niamniam: by the Nabambisso River, *Schweinfurth*, 3047! Uganda: Ruwenzori; Kivata, *Scott-Elliot*, 7693! Unyoro, *Speke & Grant*, 605! British East Africa: Ribe, *Wakefield!*

Lower Guinea. Angola: Golungo Alto; Sange, *Welwitsch*, 6096! Loanda, *Gossweiler*, 388! Bembe, *Monteiro!*

Mozamb. Dist. German East Africa: Kilimanjaro; road to Moschi, *Volkens*, 1729; Dar es Salaam, *Kirk!* Portugese East Africa; on the mainland and island of Mozambique, *Peters*, between Senna and Lupata, *Kirk!*

Var. *semiglabrum*, C. H. Wright. Differs from the type in having small spines, fewer hairs on the leaves, smaller flowers and calyx-lobes suddenly subulate from a broad base.

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 1344!

Also in South Africa.

94. **S. dasyphyllum,** *Thonn. in Schumach. & Thonn. Beskr. Guin. Pl.* 126. Stem subherbaceous, branched, terete, tomentose. Leaves subsessile, broadly cuneate, with angular lobes, 1 ft. long, 8 in. wide, with branched hairs on both surfaces; spines on both surfaces of the larger nerves subulate, straight, compressed, ¼ in. long. Racemes leaf-opposed, 4–8-flowered; pedicels cernuous, ¼–⅓ in. long. Calyx 5-partite, rather woolly, spiny; lobes lanceolate, subacuminate, patent. Corolla rotate, blueish, ¾ in. in diam., villous outside the midpetaline areas. Stamens 5, equal, about half as long as the corolla; filaments very short; anthers oblong-linear. Ovary subglobose; style filiform; stigma obtuse. Berry subglobose, size of a large apple, dusky yellow.

Upper Guinea. Cultivated ground, *Thonning*.

Imperfectly known species.

95. **S. africanum,** *Dunal, Hist. Solan.* 238; *Syn. Solan.* 48. Leaves much and deeply crenate. Fruit baccate.—DC. Prodr. xiii. i. 372.

Africa, without precise locality, *ex Dunal*.

96. **S. congense,** *Link, Enum.* i. 187. Stem tomentose; spines straight, ½ in. long. Leaves ovate, sinuate, tapering into the petiole, 6 in. long, 5 in. wide, tomentose, spiny on the midrib. Peduncle many-flowered, thick, much shorter than the pedicels. Calyx ½ in. long, tomentose; lobes obtuse. Corolla deeply 5-lobed, blue; lobes tomentose outside. Anthers distinct, equal.

Lower Guinea. Congo, *ex Link.*

97. **S. Crepini,** *Van Heurck, Obs. Bot.* 89. A shrub, armed in all its parts with stout straight prickles. Branches terete, with short deciduous hairs. Leaves ovate or elliptic, sinuately lobed, acute, truncate and unequal at the base, 2–4 in. long, clothed with numerous short stellate hairs and bearing straight spines on both surfaces. Cyme helicoid; basal flower hermaphrodite, the others male. Calyx ⅓ in. long, 5-partite; lobes narrowly lanceolate, acuminate. Corolla 7 lin. long, 5-lobed. Stamens 5; anthers ⅓ in. long, subsessile. Ovary conical; style slightly longer than the stamens.

Upper Guinea. Senegambia, *Sieber.*

98. **S. Hildebrandtii,** *A. Br. & Bouché, Ind. Sem. Hort. Berol.* 1874, 18; *Vatke in Linnæa,* xliii. 325, *name only.*

Nile Land. Somaliland: Ahl Mountains, *Hildebrandt,* 865; Maid, *Hildebrandt,* 1412.

Native name "Aio."

99. **S. macilentum,** *A. Rich. Tent. Fl. Abyss.* ii. 105. A spiny shrub. Branches slender, ashy-tomentose; spines compressed, recurved. Leaves oblong-ovate, obtuse, cordate at the base, subentire or slightly sinuate, thinly membranous, pilose, petioled. Cymes lateral on a long peduncle, usually 2-forked, many-flowered, tomentose; flowers polygamous, the basal on each branch hermaphrodite and long-pedicelled. Calyx unarmed, obsoletely 5-toothed. Corolla-lobes oblong-lanceolate, acute, tomentose outside. Anthers uniform. Berry globose, glabrous, fusiform.

Nile Land. Eritrea: Shoho, *Quartin Dillon.*

100. **S. pruinosum,** var. **pilosulum,** *Dunal in DC. Prodr.* xiii. i. 59. Herbaceous. Branches finely white pruinose. Leaves cuneate-rhomboid, 2–3 in. long, about 1 in. wide, almost glabrous above, minutely white hairy beneath. Racemes 6–7-flowered. Peduncle, pedicels, calyx and corolla hispid with short white hairs. Corolla white, 5-fid, 5 lin. wide. Anthers conniving, dehiscing by two apical slits. Berry globose, size of a pea.

Nile Land. Sennar, *Acerbi.*

101. **S. setaceum,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353. A shrub. Branches slender, densely covered with setæ about ¼ in. long, deciduous except at the hardened base. Leaves ovate, cordate. 1 in.

long, 7 lin. wide, stellately tomentose on both surfaces; petiole about ¼ in. long, stellately tomentose. Inflorescence extra-axillary; peduncle, pedicels, and calyx stellately tomentose; fruiting pedicels ⅔ in. long, incrassate at the apex. Calyx 5-partite; segments linear-lanceolate, 1½ lin. long in fruit. Corolla and stamens unknown. Berry brick-red, globose, ¼ in. in diam.

Mozamb. Dist. German East Africa: near the River Dehu, at the foot of Kilimanjaro, 3000 ft., *Volkens*, 2202.

102. **S. togoense,** *Dammer in Schlechter, West-Afr. Kautschuk-Exped.* 312, *name only.*

Upper Guinea. Togo: amongst climbing shrubs near Badja, *Schlechter*, 12974.

103. **S. uncinatum,** *R. Br. in Salt, Abyss. Append.* 64; *Roem. & Schultes, Syst. Veg.* iv. 669; *Dunal in DC. Prodr.* xiii. i. 376, *name only.*

Nile Land. Abyssinia, *Salt.*

104. **S. usaramense,** *Dammer in Engl. Pfl. Ost-Afr. C.* 353. Branches woody, terete, slender, stellately tomentose; spines numerous, sharp, recurved, less than 1 lin. long. Leaves elliptic, green and stellately pilose above, stellately tomentose and with scattered spines beneath; petiole ⅓ in. long. Inflorescence extra-axillary; pedicels stellately tomentose, spiny. Calyx cupular, 5-partite, stellately tomentose, spiny; lobes lanceolate. Corolla and stamens unknown. Berry globose, 5 lin. in diam.

Mozamb. Dist. German East Africa: Usaramo, *Stuhlmann*, 7066.

2. **PHYSALIS**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 890.

Calyx campanulate, or pyramidal, shortly or to the middle 5-lobed, enlarged in fruit, inflated, membranous, 5-angled or prominently 10-ribbed, often 5-auricled at the base; teeth conniving. Corolla subrotate or very widely campanulate, 5-angled or shortly and widely 5-lobed. Stamens 5, inserted near the corolla-base; filaments filiform; anthers erect, usually shorter than the filaments; cells parallel, dehiscing longitudinally. Ovary 2-celled; style filiform; stigma shortly 2-lobed; ovules numerous. Berry globose, enclosed in and much smaller than the inflated calyx. Seeds many or few, smooth or slenderly tuberculate-rugose, compressed; embryo near the margin, curved; cotyledons semiterete.—Annual or perennial herbs, glabrous or more often clothed with simple or stellate hairs. Leaves entire, sinuate or more rarely pinnatifid. Flowers small, solitary, axillary, pedicellate, violet, yellow or white, often purple at the base.

Species about 30, chiefly in the warmer parts of America.

Anthers yellow . . . . . 1. *P. minima.*
Anthers blue or violet.

Annual.
Leaves densely villous; corolla spotted . . 2. *P. pubescens.*
Leaves glabrous; corolla unspotted . . . 3. *P. angulata.*
Perennial; leaves densely hairy; corolla spotted . 4. *P. peruviana.*

1. **P. minima,** *Linn. Sp. Pl. ed.* 1, 183. A much-branched sparingly villous herb, about 1 ft. high. Leaves ovate, or subcordate, acuminate, entire or sinuate-dentate, $1\frac{1}{4}$ in. long, $\frac{3}{4}$ in. wide; petiole slender, $\frac{1}{3}$ in. long. Flowers solitary; pedicels slender, inserted by the side of the petioles. Calyx-tube campanulate, $\frac{3}{4}$ lin. long, enlarging in fruit to $\frac{1}{2}$ in. in diam., becoming glabrous and angular. Corolla narrowly campanulate, yellow, not spotted, 3 lin. long, $2\frac{1}{2}$ lin. in diam., shortly 5-lobed. Filaments $1\frac{1}{2}$ lin. long, filiform; anthers oblong, $\frac{3}{4}$ lin. long, yellow. Ovary globose; style $1\frac{1}{2}$ lin. long, slightly thickened upwards; stigma subcapitate; berry globose, $\frac{1}{4}$ in. in diam., smooth. —Dunal in DC. Prodr. xiii. i. 445; Benth. Fl. Austral. iv. 466; Hook. f. Fl. Brit. Ind. iv. 238; Engl. Pfl. Ost-Afr. C. 351; Hiern in Cat. Afr. Pl. Welw. i. 750; C. H. Wright in Dyer, Fl. Cap. iv. ii. 106. *P. angulata*, R. Br. in Speke, Nile, App. 641, not of Linn. *P. æquata*, Oliv. in Trans. Linn. Soc. xxix. 119, not of Jacq.

Upper Guinea. Senegal, *Roger*, 132! Sierra Leone, *Scott-Elliot*, 4086! Lagos, *Rowland! Dawodu*, 289! Siberia: Grant's Farm, Sinoe River, *Whyte!* Gold Coast, *Burton & Cameron!* Togo: near Lome, *Warnecke*, 192! Southern Nigeria: Attah (Idda) on the Niger, *Vogel*, 66! Old Calabar, *Holland*, 14! Cameroons: Batanga, *Bates*, 119!

Nile Land. Eritrea, *Schweinfurth & Riva*, 593! Niamniam, *Schweinfurth*, 2486! 3680! Uganda, *Wilson*, 150! *Whyte!* Unyoro, *Speke & Grant!*

Lower Guinea. Lower Congo: Lutete, *Hens*, A, 262! Angola: various localities, *Welwitsch*, 6026! 6055! 6056! 6057! 6058! 6059!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi and its Delta, Mazzaro and Shupanga, *Kirk!* Morambala and Vicente, *Scott!* British Central Africa: Nyasaland; Namasi, *Cameron!* Zomba Plains, *Whyte!*

2. **P. pubescens,** *Linn. Sp. Pl. ed.* 1, 183. An annual pubescent much-branched herb. Stem erect or procumbent, 1–2 ft. high. Leaves ovate or cordate, unequal at the base, from nearly entire to coarsely toothed, densely villous, sometimes glabrescent, about 2 in. long. Flowers pendulous; pedicels 3–5 lin. long. Calyx in flower campanulate, in fruit ovoid-acuminate, retuse at the base; lobes long-acuminate from a triangular base. Corolla dull yellow spotted with purplish-brown at the base, not exceeding $\frac{1}{2}$ in. in diam. Anthers violet.—Dunal in DC. Prodr. xiii. i. 446; Sendtn. in Mart. Fl. Bras. x. 132; A. Gray, Syn. Fl. N. Amer. ii. i. 234; Dewèvre in Comptes-rendus Soc. Bot. Belg. xxxiii. 103. *P. barbadensis*, Jacq. Misc. ii. 359, and Ic. t. 39.—*Solanum vesicarium virginianum, etc.*, Moris. Hist. iii. 527, § 13, t. 3, fig. 24.

Lower Guinea. Congo, *Lemaire.*

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Descamps.*

3. **P. angulata,** *Linn. Sp. Pl. ed.* i, 183. A much-branched annual, up to 2 ft. high. Stem angular, green. Leaves ovate, acute or acuminate, coarsely serrate, up to 3 in. long and 2 in. wide, glabrous, sometimes minutely puberulous on the under surface of the nerves; petiole 1–2 lin. long. Calyx campanulate, in fruit 5-angled and nearly 1 in. in diam.; lobes broad triangular, about as long as the tube. Corolla campanulate, uniformly yellow; lobes 5, acute. Anthers pale blue. Berry at first green, finally becoming yellowish-green.—Dunal in DC. Prodr. xiii. i. 448; Sendt. in Mart. Fl. Bras. x. 130.—*Alkekengi indicum glabrum, etc.*, Dill. Hort. Elth. 13, t. 12.

Upper Guinea. Sierre Leone, *Vogel,* 14! Gold Coast: Cape Coast Castle, *Vogel,* 51! Togo: near Lome, *Warnecke,* 255! Northern Nigeria: Nupe, *Barter,* 829! Kuka, *Vogel,* 44! 54! Niger, *Baikie,* 8!

Lower Guinea. Angola: Loanda, *Gossweiler,* 354!

A plant bearing a striking resemblance to this species but differing in having a spotted corolla, was collected at Attah (Idda) on the Quorra (Niger), by Vogel, 37.

4. **P. peruviana,** *Linn. Sp. Pl. ed.* 2, 1670. Herbaceous or suffruticose from a perennial rootstock, with simple white hairs on the stem, leaves and outside of the calyx. Stem erect, branched, sulcate when dry. Leaves cordate, acuminate, entire or irregularly dentate-sinuate, 3–4 in. long, $2\frac{1}{2}$–3 in. wide; petiole up to $2\frac{1}{2}$ in. long. Flowers solitary on cernuous peduncles $\frac{1}{3}$ in. long, arising just outside the leaf-axils. Calyx in flower $\frac{1}{2}$ in. in diam., campanulate with 5 lanceolate acute lobes $\frac{1}{4}$ in. long, in fruit shortly ovoid, acuminate, $1\frac{1}{2}$ in. long, $1\frac{1}{4}$ in. in diam. Corolla $\frac{3}{4}$ in. in diam., rotate-campanulate, slightly 5-lobed, pale yellow with 5 large dark purple spots at the base of the lobes. Stamens inserted near the corolla-base; filaments filiform, 2 lin. long; anthers oblong, obtuse, $1\frac{3}{4}$ lin. long. Ovary globose; style cylindrical, $\frac{1}{3}$ in. long; stigma subcapitate. Berry globose, $\frac{1}{2}$ in. in diam., glabrous.—Dunal in DC. Prodr. xiii. i. 440; Benth. Fl. Austr. iv. 466; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 238; C. H. Wright in Dyer, Fl. Cap. iv. ii. 106. *P. tomentosa,* Medic. Act. Acad. Theod. Palat. iv. Phys. (1780) 184, t. 4, not of Thunb. nor Walt. *P. incana,* Hort. Par. ex Dunal, l.c. *P. edulis,* Sims, Bot. Mag. t. 1068. *P. pubescens,* Drège, Zwei Pflanzengeogr. Documente, 88, not of Linn.

Nile Land. Uganda: Kikuyu and on the road to Eldama Ravine, 4000–6000 ft., *Whyte!* British East Africa: near Nairobi, *Whyte!* Mombasa, *Wakefield!*

Lower Guinea. Lower Congo: Stanley Pool, *Hens,* B, 97! Angola: Malange, *Gossweiler,* 1104!

Mozamb. Dist. British Central Africa: Nyasaland, Blantyre, *Scott!*

Throughout the tropics, probably a native of South America. Naturalised in South Africa.

3. WITHANIA, Pauq.; Benth. et Hook. f. Gen. Pl. ii. 893.

Calyx campanulate, 5–6-toothed, enlarged and inflated in fruit. Corolla narrowly campanulate, 3–6-fid; lobes valvate. Stamens in-

serted near the corolla-base; filaments slightly flattened; anthers erect; cells parallel, dehiscing longitudinally. Disk annular, crenulate or none. Ovary 2-celled; style filiform; stigma shortly and widely 2-lamellate or subglobose; ovules many. Berry globose, shorter than the enlarged calyx. Seeds compressed; embryo near the margin, and incurved or spiral; cotyledons semiterete.—Hoary shrubs, loosely tomentose, woolly or glabrescent. Leaves entire or slightly sinuate. Flowers usually fascicled, subsessile or shortly pedicellate, medium-sized.

Species about 5, extending from Southern Europe and Western Asia through North Africa, the Canary Islands, and South Africa.

Pedicels ½–2 lin. long	1. *W. somnifera.*
Pedicels 4–7 lin. long	
Calyx-lobes obtuse	2. *W. Holstii.*
Calyx-lobes filiform, aristate	3. *W. aristata.*

1. **W. somnifera,** *Dunal in DC. Prodr.* xiii. i. 453. An erect much-branched shrub, 3–4 ft. high. Stem terete, tomentose. Leaves ovate, obovate or oblong, obtuse, tapering towards the base, entire or very slightly sinuate, variable in size, averaging 2½ by 1 in., more or less tomentose on both surfaces; petiole ½ in. long, tomentose, channelled above. Flowers 4–6 in axillary fascicles; pedicels 2 lin. long in flower, elongating afterwards. Calyx 1 lin. in diam., campanulate, densely tomentose outside; lobes 5, lanceolate. Corolla 2½ lin. long, divided nearly to the middle into 5 triangular lobes. Filaments inserted near the corolla-base, 1½ lin. long, filiform; anthers oval, ¼ lin. long. Ovary ovoid, glabrous; style shorter than the stamens. Berry globose, glabrous, ¼ in. in diam., enclosed in the much inflated calyx. Seeds compressed.—Boiss. Fl. Orient. iv. 287; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 239; Vatke in Linnæa, xliii. 333; Engl. Pfl. Ost-Afr. C. 351, and Glied. Fl. Usamb. 39; C. H. Wright in Dyer, Fl. Cap. iv. ii. 107. *W.? arborescens,* Dunal, l.c. 455. *Physalis somnifera,* Linn. Sp. Pl. ed. 1, 182; Sibth. Fl. Græca, t. 233; var. *communis,* Nees in Linnæa, vi. 455; var. *flexuosa,* Nees, l.c. 454; Wight, Ic. t. 853. *P. tomentosa.* Thunb. Prodr. 37, and Fl. Cap. ed. Schult. 191. *P. arborescens,* Linn. Sp. Pl. ed. 2, 261. *Hypnoticum somniferum,* Rodrig. ex Dunal, l.c. 453. *Physaloides somnifera,* Moench, Meth. 473; Hiern in Cat. Afr. Pl. Welw. i. 752.

Upper Guinea. Liberia: Cape Palmas, *Vogel,* 35! Northern Nigeria: Kuka on Lake Chad, *Vogel,* 58!

Nile Land. Nubia: Singat, *Schweinfurth,* 218! Merowa, *Broomfield,* 21! Fashoda, *Muriel,* 97! Bahr el Jebel, *Broun,* 35! Darfur, *Purdy,* 125! Kordofan, *Pfund,* 106! *Kotschy,* 374! Eritrea, *Schweinfurth,* 1065! Abyssinia, *Roth,* 453 (86)! *Quartin-Dillon & Petit,* 234! Somaliland: Zafarug, *James & Thrupp!* Uganda: various localities, *Speke & Grant,* 664! *Whyte! Scott-Elliot,* 7277! *Dawe,* 316! *Brown,* 271! British East Africa: Ukamba, *Scott-Elliot,* 6315! Kibwezi River, *Kässner,* 688! Shimoni, *Whyte!*

Lower Guinea. Angola: Huilla; near Lopolla, *Welwitsch,* 6025! Benguella; near the mouth of the River Cavaco, *Welwitsch,* 6027! Mossamedes, by the River

Bero, *Welwitsch*, 6027 b.! German South-west Africa: Amboland; Kunkiyeo, *Schinz*, 404!

Mozamb. Distr. German East Africa: Usambara; Masheua, *Holst*, 3564; Uhehe; Ruaha River, *Goetze*, 473! British Central Africa: North Nyasaland, *Whyte!* Matabeleland: Tati River drift, *Holub!*

Also in the drier subtropical parts of India, Arabia, Persia, and in the Mediterranean region, the Canaries, and South Africa.

2. **W. Holstii,** *Dammer in Engl. Pfl. Ost-Afr. C.* 351. Stem erect, flexuose, tomentose. Leaves lanceolate or oval, acute or acuminate, 6 in. long, $2\frac{3}{4}$ in. wide, at first pubescent above, at length glabrous, white tomentose beneath; petiole 7–9 lin. long, tomentose. Pedicels 4–7 lin. long, clustered. Calyx cupular, sub-5-lobed, puberulous; lobes obtuse. Corolla three times as large as the calyx, $\frac{1}{3}$ in. long, campanulate, 5-lobed, tomentose outside above the calyx; lobes lanceolate. Stamens short; filaments very short; anthers cordate-ovoid, 1 lin. long. Ovary globose; style cylindrical, $1\frac{1}{2}$ lin. long; stigma subglobose.

Mozamb. Dist. German East Africa; Usambara; Magamba, *Holst*, 3843.

3. **W. aristata,** *Pauq. Diss. Bellad.* 15. A shrub; branches slightly angled, when young hirsute with yellow hairs. Leaves solitary or geminate, ovate-oblong, acuminate, nearly glabrous, green and somewhat shining above, green and pubescent or white and tomentose beneath, the lower (including the petiole) nearly 1 ft. long by 5 in. wide, the upper 2–5 in. long by $\frac{3}{4}$–$1\frac{1}{2}$ in. wide; primary nerves 5–9 each side. Pedicels 1 to several in subaxillary fascicles, filiform, $\frac{1}{2}$ in. long. Calyx cup-shaped, 5-angled, $\frac{1}{6}$ in. long, $\frac{1}{4}$ in. wide, accrescent, subpuberulous; lobes filiform, aristate, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Corolla campanulate, yellow, 6–7 lin. long, deeply lobed; lobes ovate-lanceolate, acuminate, stellately hairy outside. Filaments short, dilated at the base; anthers ovate-oblong, longer than the filaments, yellow. Ovary ovoid, glabrous; style filiform. Berry globose, subsulcate. Seeds subreniform, scrobiculate.—Webb & Berthel. Phyt. Canar. iii. iii. 284, t. 175; Dunal in DC. Prodr. xiii. i. 456, 686; Engl. Pfl. Ost-Afr. A. 118, and Glied. Veg. Usambara, 69. *Physalis aristata*, Ait. Hort. Kew. ed. 1, i. 244. *Atropa aristata*, Poir. Encycl. Suppl. i. 609; G. Don, Gen. Syst. iv. 456.

Mozamb. Dist. German East Africa: Usambara, in woods above 5500 ft.. *ex Engler.*

Also in the Canary Islands.

4. **CAPSICUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 892.

Calyx shortly campanulate, truncate or with 5 teeth or setæ, accrescent. Corolla subrotate, 5-partite; lobes valvate. Stamens 5, inserted near the corolla-base; filaments filiform; anthers shorter than or about as long as the filaments, dehiscing longitudinally. Disk small. Ovary 2- (rarely 3-) celled; style filiform; stigma more or less clavate; ovules many. Berry from small and globose to large and conical or almost linear. Seeds compressed, rugose or nearly smooth; embryo

much curved, near the circumference; cotyledons semiterete.—Annual or perennial much-branched herbs, rarely shrubby at the base. Leaves entire or repand. Pedicels solitary or 2–3-nate. Fruit erect or nodding.

Species about 50, chiefly natives of Tropical America; many cultivated throughout the tropics.

Calyx truncate.
- Branchlets nearly glabrous . . . . . 1. *C. frutescens.*
- Branchlets hirsute . . . . . 2. *C. abyssinicum.*

Calyx dentate.
- Berry oblong-linear . . . . . 3. *C. annuum.*
- Berry more or less ovoid.
  - Peduncles geminate, erect . . . . . 4. *C. baccatum.*
  - Peduncles solitary, nodding . . . . . 5. *C. cordiforme.*

1. **C. frutescens,** *Linn. Sp. Pl. ed.* 1, 189. A shrub, 2–3 ft. high; branches flexuous; branchlets slightly angled, nearly glabrous. Leaves solitary or geminate, ovate, acuminate, attenuate into the petiole, glabrous or slightly ciliate on the margin, very variable in size. Flowers solitary or in pairs; peduncles $\frac{2}{3}$–$\frac{3}{4}$ in. long, thickened upwards, erect in fruit. Calyx cup-shaped, truncate, 10-nerved, sometimes minutely 5-toothed. Corolla white or pale yellow; lobes lanceolate, acute, patent. Ovary ovoid, glabrous. Berry ovoid-oblong, obtuse, shining red.—Fingerhuth, Monogr. Capsic. 17, t. 4, fig. c; Dunal in DC. Prodr. xiii. i. 413; Sendtn. in Mart. Fl. Bras. x. 142; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 239; Cummins in Kew Bulletin, 1898, 77; Irish in Rep. Missouri Bot. Gard. 1898, 97; Hiern in Cat. Afr. Pl. Welw. i. 751. *C. conicum*, Meyer in Kotschy, Iter. Nub. n. 292; Zarb in Cat. Spéc. Bot. Pfund, 31. *C. conoides*, Roem. & Schult. Syst. iv. 562; Fingerhuth, l.c. 14. *C. fastigiatum*, Blume, Bijdr. 705; Benth. & Trim. Medic. Pl. t. 188.—*Capo-molago*, Rheede, Hort. Malab. ii. 109, t. 56.

Upper Guinea. Senegal, *Roger!* Sierra Leone, *Vogel*, 30! Ashanti: Assin yun Kumassi, *Cummins*, 152! Togo: near Lome, *Warnecke*, 356!

Nile Land. Kordofan, *Kotschy*, 292! *Pfund*, 233! 246! 288!

Lower Guinea. Angola: Ambriz, *Welwitsch*, 6066!

Cultivated throughout the tropics; native country uncertain.

Guinea, Bird or African pepper.

2. **C. abyssinicum,** *A. Rich. Tent. Fl. Abyss.* ii. 96. An erect shrub; branches geniculate, hirsute. Leaves ovate, acuminate, obtuse and slightly unequal (rarely subacute) at the base, entire, hirsute especially on the under side of the nerves, petioled. Peduncle 1-flowered, hirsute. Calyx truncate, obsoletely 5-toothed. Corolla explanate; lobes 5, oval-oblong. Fruit 2 in. long, oblong, slightly curved at the apex, smooth, shining.—Schweinf. Beitr. Fl. Aethiop. 87.

Nile Land. Abyssinia: without precise locality, *Quartin Dillon & Petit.*

3. **C. annuum,** *Linn. Sp. Pl. ed.* i. 188. Herbaceous, rarely suffrutescent, 2–5 ft. high; branches many, erect, angular, glabrous.

Leaves ovate-acuminate to oblong, 2–3 in. long, ¾–2 in. wide, pubescent on the under surface of the midrib; petiole about ½ in. long. Flowers solitary or in pairs; peduncle slightly enlarged upwards. Calyx cup-shaped, usually embracing the base of the fruit, obscurely toothed. Corolla about ½ in. in diam., greenish-white; lobes 5–6, ovate, acuminate, often inflexed at the apex. Ovary ovoid attenuate, smooth. Berry oblong-linear, acute, usually less than 1½ in. long, on peduncles of about equal length.—Fingerhuth, Monogr. Caps. 12, t. 2; Dunal in DC. Prodr. xiii. i. 412; Hook. Niger Fl. 472; Bentl. & Trim. Med. Pl. t. 189; J. Braun in Mitth. Deutsch. Schutzgeb. ii. (1889) 173; var. *conoides*, Irish in Rep. Missouri Bot. Gard. 1898, 65. *C. conoides*, Mill. Gard. Dict. ed. 8, no. 8; Dunal, l.c. 414; Engl. Pfl. Ost-Afr. C. 351. *C. conicum*, var. *orientale*, Oliver in Trans. Linn. Soc. xxix. 118.—*Vallia-capo-molago*, Rheede, Hort. Malab. ix. 65, t. 35.

Upper Guinea. Sierra Leone, *Vogel.* Togo, *Braun.* Northern Nigeria: Nupe, *Barter*, 522!

Nile Land. Soudan: Khartoum, *Petherick!* Abyssinia, *Schimper*, 2250! Uganda: Unyoro, *Speke & Grant!* near Lake Hafuru, 3000 ft., *Dawe*, 472!

South Central. Congo Free State: Monbuttu; Munza, *Schweinfurth*, 3360!

Mozamb. Dist. German East Africa: Usambara; Amboni, *Holst*, 2707! Rhodesia: Shesheke on the Zambesi, *Kirk!*

Var. *ovoideum*, Fingerhuth, l.c. 14, t. 2, fig. e. Fruit oblong-ovoid, obtuse, 1¼ in. long.

Upper Guinea. Sierra Leone: near Freetown, *Johnston*, 51!

Widely dispersed in the tropics; probably originally from South America.

4. **C. baccatum,** *Linn. Mant.* 47. A shrub 1–2 ft. high, erect; branches divaricate, obscurely angled. Leaves ovate or oblong, acuminate, glabrous or nearly so, up to 3½ in. long and 1¾ in. wide, rounded and sometimes narrowly cuneate at the base; petiole about 1 in. long. Flowers geminate, rarely solitary; peduncles erect, about 1 in. long, thickened upwards. Calyx shortly cup-shaped, glabrous; teeth 5, spreading, subulate, obtuse. Corolla dirty white, ½ in. in diam.; lobes ovate-oblong, acuminate. Ovary smooth; style slender, thickened near the apex. Berry globose-ovoid, scarlet, smooth, surrounded at the base by the enlarged calyx.—Fingerhuth, Monogr. Capsic. 18, t. 4, fig. a; Sendt. in Mart. Fl. Bras. x. 146; Dunal in DC. Prodr xiii. i. 420; Hiern in Cat. Afr. Pl. Welw. i. 751. *C. frutescens* var. *baccatum*, Irish in Rep. Missouri Bot. Gard. 1898, 99.—*Capsicum minimis siliquis*, Dodon. Stirp. Hist. Pempt. iv. cap. xxvi. 717.

Nile Land. Uganda: Entebbe, *Dawe*, 113!

Lower Guinea. Angola: Ambriz; cultivated near Mubango and Quibanza, *Welwitsch*, 6068! Golungo Alto; forests of nearly all the Sobatos, and of Mata de Quibanga, *Welwitsch*, 6064! 6071!

5. **C. cordiforme,** *Mill. Gard. Dict. ed.* 8, *n.* 2. Stem herbaceous, 1–3 ft. high, 5-angled. Leaves solitary or geminate, ovate or oblong, acuminate, tapering into the petiole, glabrous. Peduncles solitary,

nodding. thickened upwards. Calyx cup-shaped, 5–6-angled; teeth 5–6, short, obtuse, thickened at the apex. Corolla yellowish or dirty white, usually 6-fid; lobes ovate, subacuminate, inflexed at the apex. Ovary ovoid, rounded at the apex, glabrous; style thickened upwards; stigma obtuse. Berry ovoid-rotundate, cordate and surrounded at the base by the enlarged calyx, shining scarlet or yellow, 3- (rarely 2-) celled. —Fingerhuth, Monogr. Capsic. 29, t. 9, figs. c–e; Dunal in DC. Prodr. xiii. i. 427; Hiern in Cat. Afr. Pl. Welw. i. 751. *C. annuum*, var. *cordiforme*, Sendtn. in Mart. Fl. Bras. x. 148. *C. sp.*, Ficalho, Pl. Uteis, 233.

Lower Guinea. Angola: Ambriz, *Welwitsch*, 6065! Mubango, *Welwitsch*, 6067! at Quilombo between Camama and Calumbo, *Welwitsch*, 6047! Golungo Alto, *Welwitsch*, 6097!

5. **DISCOPODIUM**, Hochst.; Benth. et Hook. f. Gen. Pl. ii. 893.

Calyx shortly and broadly campanulate, scarcely accrescent, 5-toothed. Corolla urceolate; tube ovoid; lobes 5, short, patent, induplicate-valvate in bud. Stamens inserted above the middle of the corolla-tube; filaments short, filiform; anthers dehiscing longitudinally. Ovary 2-celled; style short; stigma peltate; ovules numerous. Berry globose Seeds much compressed, immersed in pulp; embryo near the circumference, much curved; cotyledons semiterete.—A shrub or small tree. Leaves entire. Flowers rather small in axillary fascicles.

Monotypic, endemic.

1. **D. penninervium,** *Hochst. in Flora*, 1844, 22. A shrub or small tree, 15–20 ft. high. Leaves alternate or geminate, oblong-elliptic, acuminate, acute at the base, glabrous or slightly puberulous, up to 8 in. long and 4 in. wide; petiole about 1 in. long. Fascicles many-flowered; peduncles about 5 lin. long. Calyx $1\frac{1}{2}$ lin. in diam.; teeth broadly triangular. Corolla puberulous outside, $\frac{1}{3}$ in. long, white or yellowish; lobes nearly $\frac{1}{2}$ as long as the tube, oblong, subobtuse. Filaments 1 lin. long; anthers oblong, 1 lin. long. Ovary conical; style terete, hairy; stigma $\frac{3}{4}$ lin. in diam.—Dunal in DC. Prodr. xiii. i. 478.

Upper Guinea. Fernando Po, *Mann*, 300! Cameroons; Cameroon Mountain, 7000 ft., *Mann*, 1236! 2178!

Nile Land. Abyssinia: Ghaba Valley, *Steudner*, 914! near Bahara, *Schimper*, 917! and without exact locality, *Quartin-Dillon & Petit*, 224! Uganda: West Ankole forest, 5000 ft., *Dawe*, 409!

Mozamb. Dist. British Central Africa: Nyasaland; Masuka Plateau, 6500–7000 ft., *Whyte!*

6. **LYCIUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 900.

Calyx campanulate or tubular, truncate or irregularly 3–5-toothed, not or but slightly enlarged in fruit. Corolla tubular, funnel-shaped, campanulate or urceolate; tube short or long, often swollen at the throat; lobes 4–5, flat, imbricate, patent. Stamens 4–5, inserted in the corolla-tube, included or exserted; filaments filiform, often dilated

and hairy at the base; anthers short, cells parallel, dehiscing longitudinally. Disk annular or cupular. Ovary 2-celled; ovules many. Berry globose, ovoid or conical, rather fleshy; pericarp thin or fleshy. Seeds many, rarely few or solitary, compressed; testa crustaceous, pitted; embryo much curved, near the circumference; cotyledons semiterete.—Trees or shrubs, ultimate branchlets often spiny, glabrous or pubescent. Leaves entire, linear to lanceolate, subterete or flat, often in fascicles on rudimentary branchlets. Flowers usually solitary.

Species about 50, in temperate and warm regions throughout the world; very common in extra-tropical South America.

Flowers 5-merous.	
Filaments glabrous	1. *L. persicum.*
Filaments hairy at the base	2. *L. decumbens.*
Flowers 4-merous	3. *L. arenicolum.*

1. **L. persicum,** *Miers in Ann. & Mag. Nat. Hist. ser.* 2, xiv. (1854) 12. Branches slender, glabrous or ashy pubescent, spines straight. Leaves spathulate-obovate or oblong, glabrous or puberulous, $\frac{1}{4}$–$\frac{3}{4}$ in. long, $\frac{1}{2}$–2 lin. wide; petiole up to 2 lin. long. Flowers solitary; peduncle up to $\frac{1}{4}$ in. long. Calyx shortly tubular, 2 lin. long, including the $\frac{1}{4}$ lin. long triangular lobes, ciliate. Corolla blue-purple; tube $\frac{2}{3}$ in. long, cylindrical in the lower quarter, then gradually widening upwards; lobes 5, oval, obtuse, ciliate, 1 lin. long. Stamens 5, unequal, inserted about the middle of the corolla-tube, included; filaments glabrous; anthers $\frac{1}{2}$ lin. long, shortly apiculate. Ovary globose.—Boselli in Ann. Istit. Bot. Roma, viii. 237; var. *sævum,* Vatke in Linnæa, xliii. 333. *L. mediterraneum,* vars. *cinereum, cinnamomeum* and *leucocladum,* Dunal in DC. Prodr. xiii. i. 524–525; Schweinf. in Verh. Zool.-Bot. Ges. Wien, xv. (1865) 551. *L. arabicum,* Schweinf. ex Boiss. Fl. Orient. iv. 289. *L. europæum,* Th. Anders. Florula Aden. 26, not of Linn. *L. erythræum,* Schweinf. ex Vatke.

Nile Land. Nubia: Wadi Uarag, *Schweinfurth,* 37! Wadi Rischrasch, *Schweinfurth,* 13! Wadi Abu Hamad, *Schweinfurth,* 229! coast region, *Bent! Lord!* Makaur (Macowa) Island, *Schweinfurth,* 1399! Eritrea: Erkowit Mountain, *Schweinfurth,* 251! Isola Sarad, *Terracciano,* 288; Dasych-Nocra, *Terracciano,* 280. Somaliland: Harradigit, *James & Thrupp!* Uganda: Kedong Valley, 6000–7000 ft., *Scott-Elliot,* 6610! British East Africa: Tula River, *Kirk!*

Also in Egypt and Arabia.

2. **L. decumbens,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 752. A glabrescent shrub, 1–1½ ft. high. Stems rather thick, prostrate, nodose, intricately branched, spiny; branches rigid, mostly divaricate; spines whitish, very rigid, acute, patent, $\frac{1}{6}$–$\frac{1}{2}$ in. long. Leaves alternate, and fascicled, oblanceolate, rounded at the apex, wedge-shaped at the sessile or subsessile base, fleshy, glandular-squamulose at least beneath, glaucescent, $\frac{1}{4}$–$\frac{2}{3}$ in. long, about 1 lin. broad, flat, entire. Flowers axillary, solitary, 5 lin. long; peduncle nearly $\frac{1}{6}$ in. long. Calyx campanulate, $2\frac{1}{2}$ lin. long, pale green, shortly trifid, glandular-squamulose outside; lobes more or less broadly ovate, obtuse, shortly

ciliolate, ¾ lin. long. Corolla funnel-shaped, from yellowish to violet, veined, glabrous outside, glandular-bearded in the throat, deeply cleft down one side; lobes 5, rounded, about ⅙ in. long. Stamens 5, rather shorter than the corolla, unequal; filaments hairy towards the base. Style slightly longer than the stamens, shortly cleft at the apex.

Lower Guinea. Angola: Mossamedes; on elevated maritime rocks covered with blown sand, near Cabo Negro, *Welwitsch*, 6024!

3. **L. arenicolum,** *Miers in Ann. & Mag. Nat. Hist.* xiv. (1854) 14. A much-branched shrub, 9 ft. high; branches glaucous, purplish, with decurrent ridges from the cupular nodes. Leaves sessile in fascicles of 5–10, linear, 5–7 lin. long, ½ lin. broad, acute, rather fleshy. Flowers solitary on very short peduncles, 4-merous. Calyx 1 lin. long, shortly and unequally 4-toothed; teeth ciliate. Corolla about 2½ lin. long, tubular; lobes 4, oblong, ciliate, ½ lin. long. Stamens unequal, inserted a little above the corolla-base, 1 slightly exserted, 2 reaching the throat, the 4th included; filaments hirsute at the base. Ovary ovoid, adnate to the red fleshy disk; style exserted; stigma capitate.—Ill. S. Amer. Pl. ii. t. 65, fig. E; C. H. Wright in Dyer, Fl. Cap. iv. ii. 115.

Mozamb. Dist. British Central Africa: Ngamiland; near Kwebe, *Lugard*, 70! Also in South Africa.

7. **CESTRUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 904.

Calyx campanulate, 5-lobed, valvate. Corolla salver-shaped; tube elongate, cylindrical or slightly dilated above, contracted at the base around the ovary; lobes 5, induplicate-valvate. Stamens included, fixed near the middle of the corolla-tube; filaments filiform, pilose, incrassate or with a small tooth near the base; anthers short, cells parallel. Disk inconspicuous or rather thick. Ovary usually slightly stalked, 2-celled; style filiform; stigma dilated; ovules 3–6 in each cell, micropyle inferior. Berry slightly fleshy, indehiscent, globose, ovoid or oblong. Seeds few or by abortion solitary, oblong, nearly smooth; embryo straight or slightly curved; cotyledons either ovate or oblong and much broader than the radicle, or semiterete and scarcely wider than it.—Shrubs or trees, glabrous to stellately tomentose. Leaves alternate, quite entire. Inflorescence axillary, cymose or fascicled; upper cymes usually corymbose or panicled at the apices of the branches, or nearly all lateral at leafless nodes.

Species about 160, Tropical American.

1. **C. vespertinum,** *Linn. Mant. Alt.* 206. A much-branched glabrous shrub, 12–15 ft. high. Leaves oblong, acute, submembranous, 4 in. long, 1½ in. wide. Flowers in axillary subspicate shortly peduncled clusters. Calyx campanulate, truncately 5-lobed. Corolla greenish-yellow; tube filiform, ½–⅔ in. long; lobes narrow, ¼ in. long. Berry ovoid.—Jacq. Hort. Schœnbr. iii. 43, t. 328; Dunal in DC. Prodr. xiii. i. 661. *C. jamaicense,* Lam. Encycl. i. 687.

Lower Guinea. Princes Island: *Barter*, 1975! St. Thomas Island, *Mann*, 1080!

Probably introduced from the West Indies, where it is common.

8. **DATURA,** Linn.; Benth. & Hook. f. Gen. Pl. ii. 901.

Calyx long, tubular, 5-fid or spathaceous, often persistent at the base. Corolla funnel-shaped; limb plicate; lobes 5–10, short, broad, often acuminate. Stamens 5, inserted near the base of the corolla-tube, included; anthers linear, dehiscing longitudinally, sometimes cohering into a tube. Ovary 2-celled, or more or less spuriously 4-celled; style filiform, dilated and 2-lamellate at the apex. Capsule smooth or spiny, dehiscing by 4 valves or irregularly.—Herbs, shrubs or trees, glabrous or sparingly hairy. Leaves alternate, entire or coarsely toothed. Flowers solitary, large, white, pinkish or yellow, erect or cernuous.

Species about 12, widely dispersed through the temperate and warmer regions of both hemispheres.

Capsule cernuous, spiny, dehiscing irregularly.	
Plant pubescent. Corolla 10-toothed . . .	1. *D. Metel.*
Plant glabrous or nearly so. Corolla 5–6-toothed .	2. *D. fastuosa.*
Capsule erect, 4-valved.	
Capsule smooth	3. *D. inermis.*
Capsule spiny	4. *D. Stramonium.*

1. **D. Metel,** *Linn. Sp. Pl. ed.* 1, 179. Stem erect, 3–4 ft. high, herbaceous, terete, subdichotomous, densely pubescent. Leaves solitary or the upper geminate, ovate, entire or repand-dentate, up to 8 in. long and 4 in. broad, densely pubescent on both surfaces, generally glandular. Flowers axillary, shortly pedicellate, at first erect, finally cernuous. Calyx tubular, 3 in. long, slightly pubescent; teeth 5, unequal, triangular-oblong. Corolla white, nearly twice as long as the calyx; limb 10-toothed. Filaments glabrous; anthers erect, white. Ovary muricate. Capsule globose, pendulous, spiny, dehiscing irregularly.—Dunal in DC. Prodr. xiii. i. 543; Bot. Mag. t. 1440; Sendt. in Mart. Fl. Bras. x. 162; Schweinf. Beitr. Fl. Aethiop. 276. *D. guayaquilensis,* H.B. & K. Nov. Gen. et Sp. iii. 8; Sweet, Brit. Fl. Gard. ser. 2, t. 380.

Upper Guinea. Senegal, *Boivin!* Sierra Leone: Regent, *Scott-Elliot,* 4107! French Guinea: Farana, by the River Niger, *Scott-Elliot,* 5387!

Nile Land. Soudan: Khartoum, *Petherick*! Kordofan, *Pfund,* 285! Darfur, *Pfund,* 46! British East Africa: Nairobi, *Elliot,* 82!

Cosmopolitan in the tropics; probably originally from South Tropical America.

2. **D. fastuosa,** *Linn. Syst. ed.* 10, 932. Annual. Stem erect, 4–5 ft. high, branched, dark purple with scattered white spots. Leaves up to 8 in. long and 2 in. broad, the upper sometimes geminate, ovate-lanceolate, acuminate, sinuate or repand-dentate, unequal at the base, glabrous on both surfaces. Flowers erect. Calyx tubular, 2 in. long; teeth 5, triangular-lanceolate, acuminate. Corolla white inside, violet outside, 5–6-plicate, folds long-cuspidate. Anthers linear, purplish. Capsule spiny, pendulous, dehiscing irregularly.—Dunal in DC. Prodr. xiii. i. 542; Wight, Ic. t. 1396; Schweinf. Beitr. Fl. Aethiop. 276; Sendtn. in Mart. Fl. Bras. x. 162; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 242; Peters, Reise Mos-

samb. Bot. 231 ; Engl. Pfl. Ost-Afr. C. 356 ; Kirtikar in Journ. Bomb. Nat. Hist. Soc. xiv. 20, t. U.—*D. Ægyptia*, Vesl. Pl. Ægypt. 202.

Nile Land. Eritrea : near Acrur, 6000 ft., *Schweinfurth & Riva*, 1235!

Mozamb. Dist. Portuguese East Africa : throughout the Mozambique district, ex *Peters*,

Cosmopolitan in the tropics.

Var. *alba*, C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 243. A larger plant than the type ; corolla quite white ; capsule with shorter spines.—Hiern in Cat. Afr. Pl. Welw. i. 753. *D. alba*, Nees in Trans. Linn. Soc. xvii. 73 ; Dunal in DC. Prodr. xiii. i. 541 ; Vatke in Linnæa, xliii. 334 ; Engl. Pfl. Ost-Afr. C. 356. *D. fastuosa*, Welw. Apont. Phyto-Geogr. 551, not of Linn.

Upper Guinea. Gold Coast : near Accra, *Moloney !*

Nile Land. Uganda, *Scott-Elliot*, 7288 ! British East Africa : near Mazeras, 300 ft. *Kaessner*, 280 ! Witu, *Thomas*, 154 !

Lower Guinea. Banana, at the mouth of the Congo, *Monteiro !* Angola : Golungo Alto, *Welwitsch*, 6061 ! Loando ; Imbondeiro dos Lobos, *Welwitsch*, 6042 ! shore of Cazanga Island, *Welwitsch*, 6043 ! Benguela ; sea shore near Benguela, *Welwitsch*, 6028 ! Mossamedes ; banks of the River Bero, *Welwitsch*, 6029 !

Mozamb. Dist. Zanzibar, *Kirk*, 64 ! *Hildebrandt*, 1196 ! British Central Africa : Nyasaland ; Shire Highlands, *Kirk ! Buchanan !* Mount Chiradzulu and near Magomero, *Meller !*

3. **D. inermis,** *Jacq. Hort. Vind.* iii. 44, *t.* 82. Annual. Stem erect, 4 ft. high, branched, fistular, terete, glabrous. Leaves ovate, acute, incised-lobed ; lobes acute ; petiole long. Flowers shortly pedicelled. Calyx pentagonal, glabrous ; teeth 5. Corolla white, twice as long as the calyx ; lobes 5, rounded, acutely cuspidate. Capsule smooth, erect, 4-valved.—*D. lævis*, Linn. f. Suppl. 146 ; Schweinf. Beitr. Fl. Aethiop. 276.

Nile Land. Abyssinia, ex *Linnæus ; cultivated specimens !*

4. **D. Stramonium,** *Linn. Sp. Pl. ed.* 1, 179. A robust erect annual. Stem terete, smooth, dichotomously branched above. Leaves ovate, more or less coarsely toothed or lobed, up to 9 in. long and $3\frac{1}{2}$ in. wide, acuminate, unequal at the base, flaccid, slightly hairy when young. Flowers erect in the forks of the branches ; pedicels short. Calyx $1\frac{1}{2}$ in. long, persistent at the base ; teeth 5, triangular. Corolla 3–4 in. long, plicate in bud, tubular-funnel-shaped, white ; lobes 5, spreading or recurved, acuminate. Stamens included. Ovary pyramidal, 4-lobed. Capsule about 2 in. long, erect, ovoid, thickly clothed with spines. Seeds about $\frac{1}{6}$ in. long, reniform.—Dunal in DC. Prodr. xiii. i. 540 ; Sendtn. in Mart. Fl. Bras. x. 163 ; Schweinf. Beitr. Fl. Aethiop. 88 ; Bentl. & Trim. Med. Pl. t. 192 ; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 242 ; Hiern in Cat. Afr. Pl. Welw. i. 753 ; Cummins in Kew Bulletin, 1898, 77 ; C. H. Wright in Dyer, Fl. Cap. iv. ii. 118.

Upper Guinea. Ashanti : Assin yan Kumassi, *Cummins*, 8 ! Togo : near Lome, *Warnecke*, 364 ! Northern Nigeria : Kuka, on Lake Chad, *Vogel*, 56 !

Nile Land. Nubia : *Kotschy*, 232 ! Bugdoo, above New Dongola, *Bromfield*, 26 ! near New Dongola, *Ehrenberg*. Sennar : near Rosieres, *Cienkowsky*. Gallabat : near Matamma, *Schweinfurth*, 1369 ! 1370 ! Somaliland, *Mrs. Lort Phillips !*

Lower Guinea. Angola; Mossamedes; banks of the River Bero, near Quipola, *Welwitsch*, 6030! Loando: near Conceiçao, *Welwitsch*, 6051!

Throughout the tropics and temperate regions.

9. **HYOSCYAMUS**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 903.

Calyx tubular-campanulate or urceolate, shortly 5-fid; accrescent, rigidly many ribbed. Corolla funnel-shaped, sometimes split down one side; limb oblique, 5-fid; lobes wide, imbricate, more or less unequal, patent. Stamens inserted about the middle of the corolla-tube, usually exserted; filaments filiform, slightly dilated at the base; anthers ovate or oblong, dehiscing longitudinally. Disc none or small. Ovary 2-celled, sometimes thickened at the apex; style filiform; stigma capitate; ovules many. Capsule 2-celled, circumscissile. Seeds more or less compressed, tuberculate or scrobiculate; embryo near the margin, much curved; cotyledons semiterete.—Erect annual or biennial herbs, hairy or glabrous. Leaves sinuate, dentate or incised, rarely quite entire. Flowers usually unilateral, the lower axillary, the upper in a scorpioid spike or raceme. Corolla often reticulately veined.

Species about 9, the others in Central Asia, the Mediterranean region and Canary Islands.

Lower leaves subrotund	1. *H. grandiflorus.*
Lower leaves broadly lanceolate	2. *H. muticus,*

1. **H. grandiflorus,** *Franchet, Sert. Somal.* 48. An erect herb about 3 ft. high, covered with short glandular pubescence. Lowest leaves long petioled, subrotund, broadly subcordate or truncate at the base, margin unequally sinuate-dentate, pubescent on the nerves only; upper leaves ovate, shortly petioled, sinuate or repand. Bracts small, entire; lower peduncles 1 in. long, upper much shorter. Calyx turbinate-tubular, 1 in. long, unequally 5-toothed; teeth deltoid. Corolla funnel-shaped, 2 in. long; limb large.

Nile Land. Somaliland: Gueldora Valley, below Lasgore, *Révoil.*

2. **H. muticus,** *Linn. Mant.* 45. Herbaceous. Stem erect, 1–2 feet high, $\frac{1}{2}$–1 in. in diam., glabrous or pubescent. Leaves broadly lanceolate, 4–6 in. long, 2 in. wide, entire or dentate, almost glabrous; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, winged. Peduncle short; flowers greenish-white, tipped with purple (*Broun*). Calyx obconic, 5-fid. Corolla funnel-shaped, a little longer than the calyx; 3 upper lobes wider than the lower, 2 lower widely separated. Stamens 5, declinate, slightly exserted; anthers versatile. Style exserted. Capsule subglobose.—Oliver in Trans. Linn. Soc. xxix. 119; Vatke in Linnæa, xliii. 334; Boiss. Fl. Orient. iv. 293. *Scopolia mutica,* Dunal in DC. Prodr. xiii. i. 552. *Scopolia Datora,* Dunal, l.c. 553; Thomson in Speke, Nile Journ. App. 641.

Nile Land. Nubia: Dongola, *Broun!*

Also in Lower Egypt, Arabia, Persia, and Beluchistan.

10. **NICOTIANA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 906.

Calyx ovoid or tubular-campanulate, 5-fid. Corolla funnel- or salver-shaped; tube long, cylindrical or slightly ventricose; limb equal or oblique; lobes 5, induplicate, patent. Stamens 5, inserted below the middle of the corolla-tube, included or exserted, more or less unequal; filaments filiform; anthers ovoid or oblong, deeply 2-lobed; cells parallel, dehiscing longitudinally. Ovary 2- (rarely 4-00-) celled; style filiform; stigma dilated, shortly and widely 2-lobed; ovules numerous. Capsule 2- (rarely 4-) celled, dehiscing to the middle or lower by 2-fid valves. Seeds numerous, small, scarcely compressed, granular; embryo straight or more or less curved, cotyledons semiterete.—Herbs or undershrubs, rarely subarborescent, usually with glutinous hairs. Leaves simple, entire or sinuate. Flowers white, yellow, greenish or pink, in terminal panicles or long unilateral bracteate or ebracteate racemes, rarely solitary and axillary.

Species about 40, in extra-tropical North and South America, Australia, and the Pacific Islands.

Upper leaves sessile.	Corolla-lobes acute . . .	1. *N. Tabacum.*
Upper leaves petioled.	Corolla-lobes obtuse . .	2. *N. rustica.*

1. **N. Tabacum,** *Linn. Sp. Pl. ed.* 1, 180. A robust annual, up to 6 ft. high. Stem erect, viscid. Leaves lanceolate to ovate, the lower up to 2 ft. long and shortly petioled, the upper much smaller, sessile and more or less amplexicaul, entire, acute, sometimes undulate, viscid on both surfaces. Panicle terminal. Calyx ovoid, viscid outside, divided nearly halfway down; lobes 5, narrowly lanceolate. Corolla pink, white or pale yellow, viscid outside; tube obconic; lobes 5, patent, short, broadly triangular, acute. Stamens inserted near the base of the corolla-tube, usually included. Ovary ovoid; style about as long as the stamens. Capsule conic, acute or acuminate, as long as the calyx or slightly longer.—Dunal in DC. Prodr. xiii. i. 557, incl. var. *macrophylla*; Lehm. Hist. Nicot. 21; Oliver in Trans. Linn. Soc. xxix. 119; Peters, Reise Mossamb. Bot. 231; Schweinf. Beitr. Fl. Aethiop. 276; Engl. Pfl. Ost-Afr. C. 356; J. Br. & K. Schum. in Mitth. Deutsch. Schutzgeb. ii. (1889) 173; Zarb in Cat. Spéc. Bot. Pfund, 30; Bentl. & Trim. Med. Pl. t. 191; Hiern in Cat. Afr. Pl. Welw. i. 754; Comes, Monogr. Nicot. 7, fig. 1; C. H. Wright in Dyer, Fl. Cap. iv. ii. 119. *N. macrophylla*, Spreng. Ind. Hort. Hal. 1807, 45; Lehm. l.c. 19.

Upper Guinea. Northern Nigeria: Nupe, also cultivated from the sea to Borgu, *Barter*, 1345! Sierra Leone: Freetown, *Johnston*, 72! Togo, *Braun.*

Nile Land. Eritrea: Keren, *Steudner*, 723! Abyssinia, *Schimper*, 1412! Kordofan: Obeid, *Pfund*, 33! Jur: Jur Ghattas, *Schweinfurth*, 2355!

Lower Guinea. Angola, *Welwitsch*, 6044! 6045! *Curror!*

Mozamb. Dist. German East Africa: Unyamwezi; Mininga, *Speke & Grant*, 185! Kilimanjaro, Marungu, *Volkens*, 2234! British Central Africa: Shire Valley, *Meller!* Mashona gardens on the Kitoro or Kitolo River. *Baines!*

Also in South Africa, and South America from Bolivia and Paraguay southwards.

"Called in some 8 or 9 languages, Tabba." *Barter.* "Phodia," *Meller.*

2. **N. rustica,** *Linn. Sp. Pl. ed.* 1, 180. A herb, up to 4 ft. high. Stem terete, branched. Leaves ovate, obtuse, sometimes subcordate, glandular-pubescent, petiolate, the lower up to 1 ft. long. Flowers in terminal subpaniculate racemes, bracteate or not. Calyx cyathiform, 5-fid; lobes very short, subequal. Corolla greenish-yellow, salver-shaped, twice as long as the calyx-tube, villous; lobes 5, obtuse. Filaments villous at the base. Style slightly longer than the stamens. Capsule subglobose, obtuse or emarginate, slightly longer than the calyx.—Lehm. Hist. Nicot. 34; Dunal in DC. Prodr. xiii. i. 563; Speke, Nile, Append. 641; Oliver in Trans. Linn. Soc. xxix. 119; Schweinf. Beitr. Fl. Aethiop. 276; Duthie, Field & Gard. Crops, t. 17; Engl. Pfl. Ost-Afr. C. 356; Zarb in Cat. Spéc. Bot. Pfund, 31; Comes, Monogr. Nicot. 20, fig. 2.

Nile Land. Darfur: Bara, *Pfund*, 89! Kordofan, *Kotschy*, 25! by the Nile near Assur, *Speke & Grant!* British East Africa: near Nairobi, *Whyte!*

Also in the Argentine. Probably only cultivated in Africa.

11. **SCHWENKIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 911.

Calyx tubular or campanulate, 5-toothed. Corolla tubular, several times longer than the calyx; lobes 5, clavate or very small, alternating with entire or 2-lobed processes. Stamens didynamous or only 2, the fifth rudimentary or obsolete, inserted in the corolla-tube, included or exserted; filaments filiform or compressed; anthers ovoid. Disc annular or cupular. Ovary 2-celled; style filiform; stigma terminal; ovules numerous. Capsule 2-valved, globose or ovoid. Seeds many, small, rugulose or almost muricate; embryo straight.—Slender wiry herbs, rarely suffruticose. Leaves entire. Flowers in terminal panicles.

Species 20, South American.

Two upper corolla-lobes much longer than the lower .	1. *S. americana.*
Corolla-lobes equal	2. *S. hirta.*

1. **S. americana,** *Linn. Gen. ed.* 6, 567. A much-branched pubescent herb, about 2 ft. high. Leaves alternate, entire, the lower ovate and petioled, the upper oblong and sessile, about $\frac{3}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide. Panicle lax; pedicels very short; bracts minute, subulate. Calyx cylindrical, slightly striate, $1\frac{1}{2}$ lin. long; teeth triangular, acute, much shorter than the tube. Corolla pale violet, three times longer than the calyx; tube slightly inflated; mouth contracted; teeth clavate, two upper longer than the rest. Anthers oval. Style filiform, glabrous, as long as the filaments, subclavate at the apex. Capsule subglobose, obtuse, nearly twice as long as the calyx; valves entire, glabrous. Seeds irregularly angled, brownish.—Benth. in DC. Prodr. x. 194, and in Hook. Niger Fl. 473; Schmidt in Mart. Fl. Bras. viii. i. 251; Hiern in Cat. Afr. Pl. Welw. i. 754, partly.

Upper Guinea. Senegambia: near the Casamanca River, *Leprieur!* Sierra Leone, *Welwitsch*, 5923! *Vogel*, 89! *Scott-Elliot*, 3887! 4322! Gold Coast: Cape Coast Castle, *Vogel*, 12! Accra, *Brown*, 308! Lagos, *Millen*, 100! *Dawodu*, 4! Southern Nigeria: Stirling Island, *Vogel*, 153!

Nile Land. Niamniam: Nabambisso River, *Schweinfurth*, 3724! Jur: Kurshook Ali Seriba, *Schweinfurth*, 1752! Jur Ghattas, *Schweinfurth*, 2110!

Lower Guinea. Lower Congo, *Burton!* Angola: Golungo Alto; roadsides at Sange, *Welwitsch*, 5902! 5898! manioc plantations near Agnas Doces, *Welwitsch*, 5901! between Trombeta and Cabondo, *Welwitsch*, 5903!

Var. *angustifolia*, Schmidt in Mart. Fl. Bras. viii. i. 251. Leaves narrower than in the type, almost glabrous.

Upper Guinea. Northern Nigeria: Nupe, *Barter!*

Nile Land. Moru: Neangara, *Petherick!*

Lower Guinea. Lower Congo: Lutete, *Hens*, A, 260!

Also in Brazil.

The whole plant is pounded and used as a fish poison.—*Dawodu.*

2. **S. hirta,** *Klotzsch in Linnæa*, xiv. 289. A herb, up to 2 ft. high. Stem densely hirsute. Leaves ovate or oblong, obtuse, $\frac{2}{3}$ in. long, $\frac{1}{4}$ in. wide, hirsute on both surfaces, sometimes undulate, ciliate; petiole short. Panicle large, lax; branches slender. Calyx tubular, $\frac{1}{6}$ in. long; teeth very short, triangular. Corolla pale violet or yellow, 5 lin. long, less than 1 lin. in diam.; lobes clavate, equal. Stamens 2; filaments sparingly pilose. Capsule $\frac{1}{4}$ in. long, acute or mucronate.—Benth. in DC. Prodr. x. 194; Schmidt in Mart. Fl. Bras. viii. i. 250. *S. americana*, Hiern in Cat. Afr. Pl. Welw. i. 754 partly.

Upper Guinea. Upper Volta: Salaga, *Krause!* Sierra Leone, Sherboro, *Garrett in Herb. Scott-Elliot*, 5830! Talla hills, 4000 ft., *Scott-Elliot*, 5087a!

Nile Land. Jur: Wau, *Schweinfurth*, 1670!

Lower Guinea. Angola: Loanda, *Gossweiler*, 194! near Quicuxe and along nearly the whole coast as far as Ambriz, *Welwitsch*, 5914!

Also in Brazil and Guiana.

ORDER XCII. SCROPHULARIACEÆ. (By W. Botting Hemsley and S. A. Skan).

Flowers hermaphrodite, more or less irregular. Calyx inferior, persistent; tube campanulate or tubular or sometimes almost none; teeth, lobes or segments usually 5, sometimes 4, rarely 3, valvate, imbricate or open in bud. Corolla-tube campanulate, cylindric or ventricose or enlarged above, more or less curved or straight, sometimes very short, in some genera with 1 or 2 spurs or sacs at the base; limb 5- or 4-lobed (rarely 3- or 6–8-lobed), with the lobes more or less equal and all spreading, or distinctly 2-lipped; upper lip entire, emarginate or 2-lobed, erect, concave or galeate, or sometimes flat and spreading; lower lip 3-lobed, usually spreading, sometimes gibbous at the base or with a palate closing the throat of the corolla; lobes variously imbricate in bud, not plicate, valvate or twisted. Stamens usually 4, didynamous, or 2, rarely 3 or 5, the fifth or uppermost quite absent or reduced to a staminode; filaments inserted in the corolla-tube or at the throat, filiform or slightly dilated, the lower sometimes appendaged at the base; anthers 1- or 2-celled, free or coherent or

approximated in pairs; cells similar or one smaller or sometimes larger and horn-like and sterile or nearly sterile; connective sometimes 2-branched, each branch bearing a fertile cell or one branch with a fertile cell and the other with a disc-shaped appendage. Disc hypogynous, annular or unilateral, entire or rarely many-toothed, more or less prominent or in some genera obsolete. Ovary superior, sessile, entire, 2- (rarely 3- or very rarely 1-) celled; placentas central, adnate to the septum; style simple, entire or shortly 2-lobed at the apex, stigmatose at the clavate, narrow or capitate apex, or on the inside or margins of the lobes. Ovules numerous or several in each cell, rarely few, anatropous or amphitropous. Fruit superior, usually capsular, septicidal or loculicidal (sometimes both), or dehiscing by pores at the apex, rarely baccate and indehiscent. Seeds numerous, several or rarely few, sessile or nearly so; hilum basilar or lateral; funicle short, small or dilated; testa sometimes membranous and adpressed, pitted, reticulate, scrobiculate, many-ribbed or rarely smooth, sometimes loosely-celled and hyaline; nucellus covered by a thin integument; albumen fleshy, rarely thin or quite disappearing; embryo usually straight and scarcely shorter than the albumen; radicle turned towards the hilum.—Annual or perennial herbs, undershrubs or shrubs, rarely trees, glabrous, variously pubescent, or glandular-viscose. Leaves opposite (especially the lower), alternate or verticillate, entire, toothed or variously lobed or dissected; stipules 0. Flowers axillary or in terminal racemes, spikes, heads or panicles, racemosely or cymosely arranged; pedicels ebracteolate or in some genera 2-bracteolate.

Genera about 200; species about 2200, cosmopolitan, but most abundant in temperate regions.

Cyclocheilon, Oliver in Kew Bulletin, 1895, 222, belongs to the *Verbenaceæ*.

Zenkerina, Engl. in Engl. Jahrb. xxiii. 497, t. 10, figs. A–F, belongs to the *Acanthaceæ*. Hallier f. in Bull. Herb. Boiss. 2me sér. iii., 202, refers it to *Staurogyne*, but Mr. C. B. Clarke, who has examined the pollen, regards it as a new genus most nearly allied to *Hemigraphis*.

Hiernia, S. Moore in Journ. Bot. 1880, 196; Engl. & Gilg in Baum, Kunene-Samb. Exped. 363, t. 8, is included amongst the *Acanthaceæ* in this work.

TRIBE I. **Aptosimeæ.**—*Leaves all alternate or very rarely opposite. Corolla-tube widened into a long throat; lobes 5, flat, subequal, spreading, the two upper outside in bud. Anthers 1-celled by confluence. Flowers solitary in the axils of the leaves, the upper often racemose.*

Stamens 4.
- Anthers of the upper stamens often empty; capsule obtuse or emarginate . . . . . 1. APTOSIMUM.
- Anthers of all the stamens equally perfect; capsule acute . . . . . 2. PELIOSTOMUM.

Stamens 2, without staminodes . . . . . 3. ANTICHARIS.

TRIBE II. **Verbasceæ.**—*Leaves all alternate. Corolla rotate or shortly campanulate; tube very short, sometimes almost obsolete; lobes 5, broad, the 2 upper outside in bud. Anthers 1-celled by confluence. Flowers solitary or fasciculate, in terminal spikes or racemes.*

- Stamens 5 . . . . . 4. VERBASCUM.
- Stamens 4 . . . . . 5. CELSIA.

TRIBE III. **Hemimerideæ.**—*Leaves (the lower at least) opposite. Corolla-tube very short; limb usually 2-lipped; the upper lip outside in bud; lower lip with* 1 *or* 2 *spurs or sacs or pits at the base; lobes all flat. Anther-cells divergent or divaricate, distinct or often confluent. Capsule 2-valved.*

Usually erect herbs or undershrubs; lower lip of corolla 4-lobed; capsule compressed, septicidal . . 6. NEMESIA.

Creeping or prostrate herbs; lower lip of corolla 3-lobed; capsule globose or subglobose, scarcely compressed, loculicidal . . . . . 7. DICLIS.

TRIBE IV. **Antirrhineæ.**—*Leaves (the lower at least) opposite, rarely all alternate. Corolla-tube rather long, gibbous, saccate or spurred at the base in front; limb 2-lipped; upper lip outside in bud; lower lip often produced at the base into a palate. Stamens* 4, *rarely the upper without anthers; anther-cells confluent or distinct. Capsule dehiscing by apical pores or valves.*

Corolla-tube spurred . . . . . 8. LINARIA.

Corolla-tube not spurred, but usually saccate or gibbous at the base.

Corolla $2\frac{1}{2}$ lin. long; tube not saccate or gibbous at the base; lower lip without a palate; capsule small and hard . . . . . 9. ANARRHINUM.

Corolla 3–9 lin. long; tube saccate or gibbous at the base; lower lip with a prominent palate; capsule much larger, with a membranous pericarp.

Corolla 3–4 lin. long; anther-cells confluent at the apex; upper cell of the capsule much smaller than the lower, 3- or 4-seeded or empty . . 10. SCHWEINFURTHIA.

Corolla 4–9 lin. long; anther-cells distinct; cells of the capsule equal or nearly so, both many-seeded . . . . . 11. ANTIRRHINUM.

TRIBE V. **Cheloneæ.**—*Leaves (the lower at least) opposite, very rarely all alternate. Corolla-tube long or rather long, not saccate, gibbous or spurred, or only very slightly gibbous at the base; limb usually 2-lipped; upper lip outside in bud. Stamens* 4, *rarely* 2, *the fifth upper stamen often represented by a staminode. Fruit a* 2- *or* 4-*valved capsule or baccate and indehiscent.*

Shrubs or trees; corolla $\frac{3}{4}$–$1\frac{1}{4}$ in. long; staminode absent; fruit baccate . . . . . 12. HALLERIA.

Usually herbs; corolla less than $\frac{1}{2}$ in. long; staminode present; fruit a septicidal capsule . . . 13. SCROPHULARIA.

TRIBE VI. **Manuleæ.**—*Leaves (the lower at least) opposite or rosulate. Corolla-tube very often long, not saccate or spurred at the base; limb equally or nearly equally lobed; upper lobes outside in bud. Stamens* 4, *rarely* 2; *anthers* 1-*celled by confluence of the divaricate cells. Capsule* 2- *or* 4-*valved.*

Bract shortly adnate to the pedicel and calyx; calyx 2-lipped or 2-partite . . . . . 14. POLYCARENA.

Bract free from the calyx and not adhering along the pedicels; calyx 5-partite or 5-fid.

Style shortly 2-lobed . . . . . 15. JAMESBRITTENIA.

Style entire.

Leaves often in a basal rosette; flowers often cymose: corolla-tube very slender, straight, not dilated or gibbous at the apex . . 16. MANULEA.

Leaves not in a basal rosette; flowers usually axillary or simply racemose; corolla-tube often curved, usually wider and dilated or gibbous at the apex . . . . 17. SUTERA.

TRIBE VII.—**Gratioleæ.**—*Leaves (the lower at least) opposite. Corolla-tube long or sometimes short, not saccate or spurred; limb nearly equally lobed or sometimes more or less 2-lipped; lobes usually flat, the upper outside in bud (except in* Lindenbergia, *in which the lower lip is outside). Perfect stamens 4 or 2; anther-cells distinct or subconfluent at the apex, rarely quite confluent. Capsule 2- or 4-valved.*

* Stamens 4, didynamous, or the upper pair only perfect, the lower reduced to staminodes.

† Stamens all inserted in the corolla-tube; lower without appendages.

Calyx tubular or campanulate, 5-toothed or 5-fid.

Calyx tubular, 5-toothed; anther-cells contiguous . . . . . 18. MIMULUS.

Calyx campanulate, 5-fid; anther-cells separate, on a 2-branched connective . . . 19. LINDENBERGIA.

Calyx 5-partite or deeply 5-fid.

Anther-cells confluent at the apex; capsule turned downwards . . . . 21. STEMODIOPSIS.

Anther-cells distinct and separate; capsule not turned downwards.

Woolly or very glandular terrestrial plants; placentas 2, free or united, wingless . 20. STEMODIA.

Glabrous aquatic or bog plants; placentas united into a column which is winged on both sides after dehiscence . . 22. LIMNOPHILA.

Anther-cells distinct but contiguous, not confluent at the apex.

Perfect stamens 4 . . . . . 23. MONIERA.

Perfect stamens 2 . . . . . 24. DOPATRIUM.

†† Upper stamens inserted in the corolla-tube; lower stamens inserted at the throat, sometimes perfect, usually with variously shaped appendages at the base, or reduced to staminodes.

Perfect stamens 4.

Calyx 5-partite; segments broad, imbricate; lower stamens with a scale-like appendage; flowers large . . . . . 25. ARTANEMA.

Calyx 5-toothed or if 5-partite with the segments narrow and not distinctly imbricate; lower stamens gibbous or with a minute tooth-like or setaceous appendage; flowers small.

Calyx tubular, plicate or winged, 3–5-toothed or 2-lipped.

Calyx 5-toothed; lower stamens dilated and sharply bent at the base, gibbous 26. CRATEROSTIGMA.

Calyx slightly 2-lipped; lower stamens not sharply bent, with a tooth-like or setaceous appendage . . . 27. TORENIA.

Calyx 5-partite, or if tubular not plicate or winged . . . . . 28. LINDERNIA.

Perfect stamens 2 . . . . . 29. ILYSANTHES.

** Stamens 2–5 (scarcely didynamous when 4), the lower pair always perfect, the upper either perfect, or reduced to staminodes or quite absent.

Flowers sessile; stamens 2; anther-cells unequal; capsule 1-celled . . . . . 30. DINTERA.
Flowers stalked; stamens 4 or 3 (sometimes 2 or 5); anther-cells equal; capsule 2-celled at least in the lower part.
Leaves opposite, sessile; calyx 4–5-partite; anthers distinctly 2-celled . . . 31. HYDRANTHELIUM.
Leaves usually in radical tufts, long-stalked; calyx 5-toothed; anthers 1-celled by confluence . . . . . 32. LIMOSELLA.

TRIBE VIII. **Digitaleæ.**—*Leaves alternate or opposite. Corolla-lobes flat, spreading or the upper suberect, the upper inside in bud. Anther-cells closely contiguous at the apex and very often confluent, usually divergent at the base, sometimes completely confluent. Herbs, or sometimes shrubs, not parasitic.*

Stamens 4 or sometimes 5.
Prostrate herbs; leaves long-stalked, suborbicular; calyx campanulate, 4–8-fid . . . . 33. SIBTHORPIA.
Erect undershrubs; leaves shortly stalked, linear to oblong-lanceolate; calyx 4–5-partite.
Corolla 4-fid; capsule septicidal . . . 34. SCOPARIA.
Corolla 5-fid; capsule loculicidal . . . 35. CAPRARIA.
Stamens 2 . . . . . 36. VERONICA.

TRIBE IX. **Gerardieæ.**—*Leaves (the lower at least) opposite. Corolla-tube long or sometimes short, not saccate or spurred at the base; lobes flat, usually spreading, one or both of the upper inside in bud. Stamens 4, didynamous or rarely equal, rarely 2; anthers equally 2-celled, sometimes 1-celled, sometimes with a fertile cell and a variously modified sterile or nearly sterile cell; connective sometimes 2 branched, 1 branch bearing a fertile cell and the other a disc-shaped appendage. Herbs or undershrubs, often parasitic or semi-parasitic.*

* Anthers with 2 fertile equal or nearly equal cells.
Calyx enlarged and inflated in fruit . . . 37. MELASMA.
Calyx not enlarged nor inflated in fruit.
Pedicels ebracteolate; corolla about 1 in. long; tube very much longer than the calyx . 39. GERARDIINA.
Pedicels bibracteolate; corolla usually less than ½ in. long; tube shorter or scarcely longer than the calyx.
Parasitic; stems rather stout; leaves usually broad and toothed or sometimes reduced to scales; flowers often crowded . . 38. ALECTRA.
Not parasitic; stems very slender, with almost filiform branches; leaves narrowly linear, entire; flowers not crowded . . . 53. MICRARGERIA.

** Anthers 1-celled or with 1 fertile cell and 1 variously modified sterile or nearly sterile cell or appendage.
† Anthers all 1-celled.
Corolla-tube cylindric, straight or sometimes slightly curved.
Capsule oblong or ellipsoid, straight; calyx tubular.
Corolla often small; lobes equal or nearly equal; capsule dry, dehiscent . . 40. BUCHNERA.

Corolla often large; upper lobes united, smaller than the lower; capsule fleshy, indehiscent . . . . 45. CYCNIUM.
Capsule nearly always obliquely ovoid and long-beaked; calyx campanulate or sometimes tubular-campanulate . . . 44. RHAMPHICARPA.
Corolla-tube rather sharply curved at or above the middle, often dilated at the curve.
Stems erect; placentas much thickened; seeds very small and numerous . . . 41. STRIGA.
Stems prostrate; placentas scarcely thickened; seeds much larger and fewer . . . 42. CYCNIOPSIS.
†† Anthers (at least two of them) with 1 fertile cell and 1 variously modified sterile or nearly sterile cell or appendage.
Stamens 2, the lower pair reduced to staminodes 43. STRIGINA.
Stamens 4.
Stems climbing.
Leaves pinnatisect or pinnatifid; anthers of the lower stamens 1-celled, without a modified second cell . . . . 47. BUTTONIA.
Leaves coarsely few-toothed; all the anthers with 1 large fertile cell and a smaller sterile one . . . . . 48. THUNBERGIANTHUS.
Stems not climbing.
Not parasitic; more or less leafy.
Corolla-tube much longer than the calyx, ventricose above; 2 of the 4 anthers 1-celled, without a modified second cell.
Corolla nearly equally 5-lobed; anthers of the upper stamens with 1 fertile cell and a long spur-like sterile cell; anthers of the lower stamens with 1 fertile cell; dehiscence longitudinal . . . . 49. GHIKÆA.
Corolla 2-lipped; anthers of the upper stamens with 1 fertile cell, of the lower with a distinctly branched connective bearing at one end a fertile cell and at the other a disc-like appendage; dehiscence by an apical pore . . . 50. PSEUDOSOPUBIA.
Corolla-tube not longer than the calyx, shortly funnel-shaped; all 4 anthers with 1 fertile cell and a narrow sterile cell.
Anthers coherent . . . . 51. SOPUBIA.
Anthers free . . . . . 52. BAUMIA.
Parasitic; leaves usually reduced to scales . . . . . 46. HARVEYA.

TRIBE X. **Euphrasieæ.**—*Leaves opposite. Corolla 2-lipped or rarely nearly equally 5-lobed, not saccate nor spurred at the base; upper lip erect, concave or galeate, inside in bud. Stamens 4, didynamous, rarely 2, ascending against the*

upper lip of the corolla. Anthers 2-celled, rarely with 1 cell smaller than the other or quite absent. Capsule loculicidal.

Only Tropical African genus . . . . . 54. BARTSIA.

1. **APTOSIMUM,** Burch.; Benth. et Hook. f. Gen. Pl. ii. 927.

Calyx usually deeply 5-cleft; lobes narrow, subvalvate. Corolla-tube narrow at the base, then suddenly expanded into a long throat; limb spreading, oblique, 5-lobed; lobes flat, nearly equal, rounded, the two upper outside in æstivation. Stamens 4, didynamous, attached near the base of the corolla, included; filaments filiform; anthers transverse, hispid or ciliate, 1-celled by confluence, those of the two smaller posticous ones often empty. Style filiform; stigma small, emarginate. Capsule short, compressed at the top contrary to the septum, obtuse or emarginate, septicidally 2-valved; valves 2-cleft, adhering to the placentiferous column at the base. Seeds numerous, small, obovoid or depressed-spherical; testa reticulated; funicle sometimes dilated; embryo straight or slightly curved, cotyledons ovate.—Dwarf dense often glandular-hairy spinescent under shrubs or rigid herbs. Leaves alternate, crowded, often narrow, 1-nerved. Flowers sessile or very shortly stalked, axillary, 2-bracteolate. Corolla usually veined.—*Chilostigma*, Hochst. in Flora, 1841, i. 372.

A genus confined to Africa. In addition to the following there are 9 species in South Africa.

* Leaves linear to lanceolate, often 3 or 4 in. long; midrib persistent and often spinescent (scarcely spinescent in *A. pumilum*).

Plant dwarf, cæspitose, usually with very short branches.

Calyx cleft very nearly to the base.

Corolla scarcely $\frac{1}{2}$ in. long . . . . 1. *A. pumilum.*

Corolla $\frac{3}{4}$–1 in. long.

Bracts shorter or not longer than the calyx; corolla about 1 in. long . . 2. *A. Nelsii.*

Bracts longer than the calyx; corolla about $\frac{3}{4}$ in. long . . . . . 3. *A. lineare.*

Calyx not cleft below the middle.

Leaves up to $2\frac{1}{2}$ in. long, densely and shortly glandular-pubescent . . . . 4. *A. glandulosum.*

Leaves up to $1\frac{1}{4}$ in. long, very scabrid . . 5. *A. scaberrimum.*

Plant with decumbent or erect branches up to 1 ft. long.

Leaves thick and fleshy, lanceolate, 8–12 lin. long, 2–3 lin. broad . . . . . 6. *A. Gossweileri.*

Leaves thin, linear, linear-lanceolate or linear-oblanceolate, 1-$2\frac{3}{4}$ in. long, $1\frac{1}{3}$–$2\frac{1}{2}$ lin. broad.

Calyx-segments broadest above the middle . 7. *A. arenarium.*

Calyx-segments broadest at the base.

Flowers solitary; leaves up to 2 in. long.

Leaves 1–$1\frac{1}{2}$ in. long; calyx 2–3 lin. long; corolla up to 9 lin. long . 8. *A. Welwitschii.*

Leaves $1\frac{3}{4}$–2 in. long; calyx $1\frac{1}{2}$–2 lin. long; corolla up to 12 lin. long .	9. *A. angustifolium.*
Flowers several together; leaves about $2\frac{3}{4}$ in. long	10. *A. Schinzii.*
** Leaves lanceolate, oblanceolate, obovate or oblong, usually less than 1 in. long; midrib not persistent.	
Branches with a thick corky layer; leaves and calyx glabrous	11. *A. suberosum.*
Branches without a thick corky layer; leaves and calyx more or less hairy.	
Hairs mostly not glandular; leaves $\frac{1}{4}$–$\frac{2}{3}$ in. long.	
Branches slender; leaves distinctly petiolate .	14. *A. elongatum.*
Branches 2–$2\frac{1}{2}$ lin. thick at the base: leaves sessile	15. *A. pubescens.*
Hairs mostly glandular; leaves 1–2 in. long.	
Plant not densely hairy; hairs often very short and stiff; leaves broadest at or above the middle	12. *A. decumbens.*
Plant densely hairy; hairs often long and very slender; leaves broadest below the middle	13. *A. molle.*

1. **A. pumilum,** *Benth. in DC. Prodr.* x. 345. A densely cæspitose annual or biennial herb 3 or 4 in. high. Leaves linear, linear-lanceolate or linear-oblong, 1–3 in. long, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, minutely pubescent, slightly scabrid especially on the margins and on the underside of the midrib, attenuated and conspicuously ciliate at the base; midrib hard but scarcely spinescent. Flowers sessile, solitary or two or more together, shorter than the leaves. Bracts ciliate, linear, shorter than the calyx in the lower flowers, longer than the calyx in the upper. Calyx-tube very short; segments $\frac{1}{3}$ in. long, subulate, ciliate. Corolla scarcely $\frac{1}{2}$ in. long, white outside, blue inside, pubescent. Anthers of the lower stamens nearly glabrous. Capsule globose, compressed at the apex, slightly emarginate. Seeds rather long, subquadrangular, black, minutely papillose.—*Chilostigma pumilum,* Hochst. in Flora, 1841, i. 372.

Nile Land. Kordofan: Kohn Mountain, *Kotschy,* 227 !

2. **A. Nelsii,** *Weber in Bull. Herb. Boiss.* 2^{me} *sér.* iii. 900. An undershrub with a thick few-branched stem bearing short spines; branches erect, densely leafy, very minutely puberulous. Leaves linear or narrowly elliptic, about 3 in. long and $1\frac{1}{2}$ lin. broad, broadest above the middle, gradually narrowed towards the base, glandular on both sides, furnished on the upper side at the base with numerous short conical hairs. Flowers shortly pedunculate, 3 (rarely 5) in axillary dichasia. Bracts about 5 lin. long. Calyx $3\frac{1}{2}$ lin. long, glandular-hairy inside and outside, sparing ciliate in the angles between the teeth; tube 1–$1\frac{1}{2}$ lin. long; segments narrowly lanceolate, twice as long as the tube. Corolla blue, about 1 in. long, sparingly glandular outside; lobes short, oval. Upper stamens 2 lin. long; lower $4\frac{1}{2}$ lin. long; smaller anthers without pollen. Capsule obovoid, pilose.

Lower Guinea. German South-west Africa: Hereroland, *Nels*, 253. Ozongombo, *Rautanen*, 426.

3. **A. lineare,** *Marl. & Engl. in Engl. Jahrb.* x. 250. A dwarf branched cæspitose undershrub; branches up to 6 in. long, often very short, densely leafy. Leaves linear, 2–4 in. long, 1½–3 lin. broad, acute, pubescent and usually conspicuously ciliate at the base: pubescence sometimes ferruginous; midribs rigid, thick, persistent and spinescent. Flowers sessile. Bracts narrowly linear, 2½ lin. long. Calyx-segments ¼ in. long, linear, acute, ciliate and sparingly glandular-pubescent, prominently 1-nerved. Corolla about ¾ in. long, blue, pilose outside; lobes broadly obovate, subequal. Lower pair of stamens two-thirds as long as the corolla; anthers pilose. Style as long as the corolla-tube. Capsule about 1 lin. shorter than the calyx, broadly obovate, emarginate, compressed at the apex, sparingly pubescent, reticulate. Seeds black, scrobiculate.—Hiern in Cat. Afr. Pl. Welw. i. 755, and in Dyer, Fl. Cap. iv. ii. 129. *A. Randii*, S. Moore in Journ. Bot. 1899, 171, and 1900, 467.

Lower Guinea. Angola: Mossamedes; base of Serra de Montes Negros, *Welwitsch*, 5817! Caldeira do Inferno, *Welwitsch*, 5818! German South-west Africa: Dammaraland, *Schinz*, 36! *Lindner!* Hereroland; Usakos, *Marloth*, 1241!

Mozamb. Dist. British Central Africa: Matabeleland; Bulawayo, *Hon. Mrs. Evelyn Cecil*, 115! *Gardner*, 63! *Rand*, 180! and without precise locality, *Elliott*! North Kalahari Desert: near T'Klakane Pits, *Lugard*, 230! South African Gold Fields, *Baines!*

Also in South Africa.

Var. *ciliatum*, Weber in Bull. Herb. Boiss. 2me sér., iii. 897. Branches longer, erect, very corky in the lower part. Leaves linear, narrowed towards the base, long-ciliate on the margins from the base to the middle. Spines stronger, 10–12 lin. long, ¾ lin. thick at the base. Capsule 2–2½ lin. long, shortly hairy.

Lower Guinea. German South-west Africa: Hereroland, *Lüderitz*, 104, 7a, *Nels*, 254. Otyowazondu, *Rautanen*.

Also in South Africa.

Var. *acaule*, Weber, l.c. 898. Primary axis very short (scarcely 5 lin. long). Leaves glabrous. Corolla tomentose-ciliate outside; narrow lower part of the tube 2 or 3 times longer than the upper inflated part. Capsule glabrous.

Lower Guinea. German South-west Africa: North Hereroland (Upingtonia); Tscheweb, *Schinz*, 515.

Var. *angolense*, Weber, l.c. 898. Branches longer (about 6 in. long); internodes 2½–5 lin. long. Leaves linear, very shortly pilose, about 3 in. long, 2 lin. broad. Bracts equalling the calyx-segments. Calyx-segments glandular inside. Corolla sparingly ciliate outside.

Lower Guinea. Angola: *Newton*.

I have seen no specimens of the above varieties.

4. **A. glandulosum,** *Weber & Schinz in Bull. Herb. Boiss.* 2me *sér.* iii. 899. A glandular-pubescent branched undershrub, about 3 in. high. Leaves narrowly linear, up to 2½ in. long, acute, crowded so as to conceal the stem, conduplicate in the dried state, densely and shortly glandular-pubescent, somewhat scabrid; lower part of midrib persistent and spinescent. Flowers solitary, or rarely 2 together,

axillary very shortly pedunculate. Bracts $2\frac{1}{2}$ lin. long, lanceolate or linear, acute. Calyx shortly and densely glandular-pubescent; tube campanulate, about $\frac{1}{4}$ in. long, almost transparent, slightly inflated in the middle, gradually narrowed to the base, prominently 5-nerved; teeth as long as or slightly shorter than the tube, ovate- to triangular-lanceolate, shortly acuminate, unequal, green. Corolla blue, $\frac{3}{4}$ in. long, minutely glandular-pubescent; lobes broadly obovate, subequal. Stamens all fertile; anthers sparingly hairy. Style rather longer than the corolla-tube, glandular-pubescent on the lower half. Capsule glabrous except at the compressed pilose apex.

Lower Guinea. German South-west Africa: Hereroland, Outyo, *Rautanen*, 247!

5. **A. scaberrimum,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 185. An undershrub about 4 in. high; branches densely leafy and clothed with short stiff hairs. Leaves up to $1\frac{1}{4}$ in. long, $\frac{1}{2}$–1 lin. broad, linear-lanceolate, very scabrid, with bristles directed forwards; midrib persistent and spinescent. Flowers sessile or shortly stalked, in 3-flowered dichasia. Bracts linear. Calyx everywhere glandular-hairy; tube $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long; teeth $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, lanceolate, distinctly ciliate. Corolla about $\frac{3}{4}$ in. long, sparsely glandular-hairy outside; lobes rounded, more or less unequal. Anthers hispidly ciliate. Style as long as the corolla-tube. Capsule $2\frac{1}{2}$ lin. long, $2\frac{1}{2}$–3 lin. broad, shortly hairy. Seeds tuberculate.—Hiern in Dyer, Fl. Cap. iv. ii. 128.

Lower Guinea. North of Great Namaqualand, *Belck*, 60.
Also in South Africa.

6. **A. Gossweileri,** *Skan.* A robust densely glandular-pilose undershrub with long procumbent many-branched stems, branches up to a foot long or more, terete, about $\frac{3}{4}$ lin. in diam.; internodes $\frac{1}{4}$–$\frac{3}{4}$ in. long. Leaves alternate or rarely subopposite, sessile or subsessile, lanceolate, $\frac{2}{3}$–1 in. long, $\frac{1}{6}$–$\frac{1}{4}$ in. broad, acute or sometimes obtuse, gradually narrowed to the apex, narrowly cuneate at the base, thick, soft, fleshy; midrib scarcely visible except at the base, persistent as a straight stout spine. Flowers axillary, usually 2 together, almost sessile, as long as or slightly shorter than the leaves. Bracts linear, $2\frac{1}{2}$ lin. long, thick. Calyx $\frac{1}{4}$ in. long, divided almost to the base; segments linear, nearly $\frac{1}{2}$ lin. broad, acute, densely covered with glandular mostly long hairs. Corolla glandular-pubescent outside; tube $7\frac{1}{2}$ lin. long; narrowed basal part about $2\frac{1}{2}$ lin. long; lobes suborbicular or broadly obovate, $1\frac{3}{4}$–2 lin. long, $1\frac{1}{4}$ lin. broad, very prominently veined. Anthers ciliate. Style as long as the corolla-tube.

Lower Guinea. Angola: Mossamedes; ravines and dry river beds of the Londy Hills, near the fazenda "Boa Vista," *Gossweiler*, 61!

7. **A. arenarium,** *Engl. in Engl. Jahrb.* x. 250. A glandular-pubescent undershrub a few inches to $1\frac{1}{2}$ ft. high. Branches ascending about $1\frac{1}{2}$ lin. in diam. rather densely leafy above, leafless and spinescent below; spines about $\frac{1}{2}$ in. long, usually straight. Leaves sessile,

linear-lanceolate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, acute, scabrid on both surfaces, often with tufts of small leaves in their axils. Flowers subsessile. Calyx-tube very short; segments broadly oblanceolate, $\frac{1}{4}$ in. long, broadest above the middle, acute, 1-nerved. Corolla about $\frac{3}{4}$ in. long, the narrowest part of the tube as long as the calyx, sparingly pilose outside; lobes broadly obovate, subequal. Anthers slightly hairy. Capsule shorter than the calyx, broadly obovate, compressed at the apex, slightly emarginate, pubescent.—Engl. & Gilg in Baum, Kunene-Samb.-Exped. 361.

Lower Guinea. Angola: Huilla; near Ediva, 2900 ft., *Baum*, 24. German South-west Africa: Dammaraland; Salem, *Lindner!* Otyimbingue, *Marloth*, 1254! between Otyikango and Otyimbingue, *Schinz*, 6!

8. **A. Welwitschii,** *Hiern in Cat. Afr. Pl. Welw.* i. 755. An undershrub branched from the base. Branches decumbent or ascending, 4–12 in. long, leafy and densely pubescent above, more or less leafless and subglabrate below, spiny chiefly below; hairs pale-subfulvous, glandular, spreading; spines $\frac{1}{2}$–1 in. long, straight. Leaves linear-oblanceolate, 1–$1\frac{1}{2}$ in. long, $1\frac{1}{5}$–2 lin. broad, pointed at the apex, much attenuated at the base, subscabrid, densely glandular-hairy. Flowers solitary, subsessile. Bracts $1\frac{1}{2}$–3 lin. long, linear, hairy. Calyx $\frac{1}{6}$–$\frac{1}{4}$ in. long, deeply toothed; teeth linear, hairy outside, glabrous inside. Corolla $\frac{2}{3}$–$\frac{3}{4}$ in. long, membranous, veined, glandular-hairy outside. Fertile anthers 2, somewhat hispid or ciliate. Style nearly $\frac{1}{2}$ in. long. Capsule 2 lin. long, shortly hairy. Young seeds papillose.

Lower Guinea. Angola: Mossamedes, by the River Maiombo at A Maiombo, *Welwitsch*, 5816!

9. **A. angustifolium,** *Weber & Schinz in Bull. Herb. Boiss. 2me sér.* iii. 896. An undershrub everywhere shortly glandular-pilose, branched near the base; branches 5 or 6, 8–10 in. high, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. thick, erect. Leaves narrowly lanceolate or linear, $1\frac{3}{4}$–2 in. long, $1\frac{1}{2}$ lin. broad, narrowed to the base, glandular-pilose on both sides, furnished on the margins and on the underside of the midrib with short conical hairs; midrib persistent, forming a slender thorn 6–$7\frac{1}{2}$ lin. long. Flowers solitary, axillary. Calyx only $1\frac{1}{2}$–2 lin. long; segments narrowly lanceolate, acute, broadest at the base, glandular-pilose on both sides. Corolla $8\frac{1}{2}$–12 lin. long, sparingly furnished with cilia and glandular hairs; lobes rounded-oval, somewhat unequal, 2–$2\frac{1}{4}$ lin. broad. Anthers ciliate. Capsule 2 lin. long, pilose.

Lower Guinea. German South-west Africa: Hereroland; between Korekas Fley and Anigab, *Belck*, 26; *Lüderitz*, 190.

10. **A. Schinzii,** *Weber in Bull. Herb. Boiss. 2me sér.*, iii. 901. An undershrub with a creeping few-branched stem; branches long and very short; long branches 6 in. long, with longer more distant leaves, ascending; short branches densely covered with shorter leaves. Leaves of the long branches linear-lanceolate, about $2\frac{3}{4}$ in. long and $2\frac{1}{2}$ lin. broad, almost horizontal; midrib persistent, spinescent. Flowers

several, in shortly pedunculate dichasia in the axils of the leaves of the longer branches. Calyx $3\frac{1}{2}$ lin. long, covered with cilia-like and several-celled conical hairs inside and outside, glandular-hairy towards the ends of the segments; tube $1\frac{1}{4}$ lin. long; segments twice as long as the tube, gradually narrowed from the base to the apex, shortly mucronate. Corolla 10–12 lin. long, ciliate outside.

Lower Guinea. German South-west Africa: Hereroland, *Nels*, 257.

11. **A. suberosum,** *Weber in Bull. Herb. Boiss. 2me sér.* iii. 904. A dwarf very much branched undershrub forming a tuft about 8 in. in diam.; branches creeping about $\frac{1}{2}$ in. in diam. at the base, surrounded by a cleft corky layer $1\frac{3}{4}$–2 lin. thick. Leaves sessile, imbricate, succulent, lanceolate, 6–$7\frac{1}{2}$ lin. long, 1–$2\frac{1}{2}$ lin. broad, glabrous, white on the margin, with a persistent and finally corky base; midrib strongly prominent on the underside. Flowers wanting in the specimen described. Calyx in the fruiting stage about $3\frac{1}{2}$ lin. long, glabrous; tube $1\frac{1}{4}$ lin. long; segments twice as long as the tube. Capsule obovoid, about $2\frac{1}{2}$ lin. long, glabrous.

Lower Guinea. German South-west Africa: Hereroland; south of the Etosapfanne, *Dinter*, 749.

12. **A. decumbens,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 184. Branches decumbent, terete, densely and shortly glandular-pubescent, glabrescent at the base, leafy. Leaves sessile or shortly petiolate, lanceolate, oblong-lanceolate or oblanceolate, 1–2 in. long, 2–$3\frac{1}{2}$ lin. broad, usually rather crowded, broadest at or above the middle, obtuse or rarely acute, shortly glandular-pubescent, slightly scabrid; midrib prominent on the underside, not persistent. Flowers axillary, usually solitary, sometimes 2 or more together, very shortly pedunculate. Bracts narrowly linear, $\frac{1}{4}$ in. long, acute, pubescent. Calyx glandular-pubescent; tube less than 1 lin. long; segments linear-lanceolate, acute, faintly 1-nerved. Corolla purple, about $\frac{3}{4}$ in. long, densely and shortly glandular-puberulous outside; lobes broadly obovate, subequal, about $2\frac{1}{2}$ lin. in diam. Anthers with a tuft of long hairs at the apex. Style as long as the corolla-tube. Capsule shorter than the calyx, broadly obovate, slightly emarginate, puberulous.—Hiern in Cat. Afr. Pl. Welw. i. 755, partly; Engl. & Gilg in Baum, Kunene-Samb. Exped. 361.

Lower Guinea. Angola: Huilla; near Lopollo towards Empalanca, *Welwitsch*, 5803! by the Kubango River, near Kalolo, 3600 ft., *Baum*, 432! German South-west Africa: Hereroland; *Lüderitz*. Amboland; Olukonda, *Schinz*, 4; Dammaraland, *Een*!

Mozamb. Dist. British Central Africa: Rhodesia; Panda-ma-Tenka, *Holub!* Victoria Falls, *Allen*, 105! Ngamiland; Okavango Valley, 3000 ft., *Lugard*, 266!

13. **A. molle,** *Skan*. A densely glandular-pilose undershrub; stems decumbent, simple or branched, up to 18 in. long, densely covered with rather long slender white glandular hairs; internodes $\frac{1}{6}$-$\frac{1}{2}$ in. long. Leaves sessile, lanceolate, 1–$1\frac{1}{2}$ in. long, $2\frac{3}{4}$–$3\frac{3}{4}$ lin. broad, broadest just below the middle, narrowed gradually and slightly from above the middle to the apex, obtuse and rounded at the apex or some-

times subacute, densely glandular-pilose on both sides, hairs very slender, unequal, usually longest on the margin and on the underside of the midrib; midrib prominent below, not persistent. Flowers axillary, solitary or sometimes 2 together, often accompanied by a short branch, very shortly pedunculate. Bracts linear, $2\frac{3}{4}$ lin. long, rather more than $\frac{1}{3}$ lin. broad, obtuse, shortly glandular-pubescent on both sides, long-glandular-ciliate. Calyx $3\frac{1}{2}$ lin. long, divided nearly to the base; segments linear, 3–$3\frac{1}{4}$ lin. long, $\frac{1}{2}$ lin. broad at the base, gradually narrowed to the apex, acute, densely glandular-pilose, with very long hairs on the margin. Corolla about 8 lin. long, minutely and sparingly glandular-pubescent outside; tube 7 lin. long; narrowed basal part 2 lin. long; inflated upper part about $2\frac{3}{4}$ lin. broad; lobes broadly obovate, 2–$2\frac{1}{4}$ lin. long, $1\frac{3}{4}$–2 lin. broad. Anthers ciliate. Style as long as the corolla-tube. Capsule broadly obovate, about $2\frac{3}{4}$ lin. long, 2 lin. broad at the apex, minutely glandular-puberulous, ciliate at the apex. —*A. decumbens*, Hiern in Cat. Afr. Pl. Welw. i. 755, partly, not of Schinz.

Lower Guinea. Angola: Bumbo, *Welwitsch*, 5804!

14. **A. elongatum,** *Engl. in Engl. Jahrb.* x. 249. A procumbent undershrub; branches slender, a few inches to a foot long, terete, pilose. Leaves shortly petiolate, oblanceolate to broadly obovate, $\frac{1}{4}$–$\frac{2}{3}$ in. long, mucronate, sparingly pilose or sometimes nearly glabrescent above. Flowers longer, usually much longer than the leaves, solitary, shortly pedunculate. Calyx-tube very short; segments 3 or 4 times as long as the tube, linear or linear-lanceolate, acute, prominently 1-nerved, ciliate and more or less pilose. Corolla about $\frac{3}{4}$ in. long, dark-blue, sparingly pilose outside; lobes nearly equal, suborbicular. Anthers slightly pubescent. Style somewhat exserted. Capsule ovoid, slightly shorter than the calyx, puberulous. Seeds about $\frac{3}{4}$ lin. long, angular, scrobiculate.—S. Moore in Journ. Bot. 1900, 467. *A. depressum*, var. *elongatum*, Hiern in Dyer, Fl. Cap. iv. ii. 131.

Mozamb. Dist. British Central Africa: Mashonaland, *Bryce!* Bechuanaland; Elephants Kloof, *Chapman & Baines!* and without precise locality, *Rand*, 641!

Also in South Africa.

15. **A. pubescens,** *Weber in Bull. Herb. Boiss. 2me sér.* iii. 903. Resembles *A. elongatum*, Engl. An undershrub branched from the base; branches procumbent, ascending at the apex, 12–16 in. long, 2–$2\frac{1}{2}$ lin. thick at the base, long-pilose. Leaves sessile, lanceolate or oblanceolate, about $7\frac{1}{2}$ lin. long and 2 lin. broad, sparingly glandular and pilose on both sides, gradually cuneate at the base; midrib strongly prominent on the underside. Flowers axillary, sessile, exceeding the leaves. Calyx $2\frac{1}{2}$ lin. long, divided almost to the base; segments narrowly lanceolate, somewhat unequal, broadest in the upper third, glandular and pilose inside and outside, ciliate on the margin. Corolla about 10 lin. long, chiefly glandular-hairy outside. Filaments of the upper stamens 2 lin. long and of the lower 4–$4\frac{1}{2}$ lin. long; anthers shortly ciliate.—Style about 10 lin. long.—*A. eriocephalum*, var. *pubescens*. Diels ex Weber l.c.

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Fleck*, 472, 490; Kœs-Riedmond, *Pfeil*, 140.

Also in extra-tropical Great Namaqualand.

2. **PELIOSTOMUM,** E. Meyer; Benth. et Hook. f. Gen. Pl. ii. 927.

Calyx 5-partite; segments narrow, subvalvate. Corolla-tube enlarged above the base into a long throat; limb spreading, 5-fid; lobes flat, subequal, rounded, the 2 upper outside. Stamens 4, didynamous, affixed near the base of the corolla, included; filaments filiform; anthers transverse, ciliate-hispid or more rarely glabrous, 1-celled by confluence, all equally perfect. Style filiform; stigma small, emarginate. Ovules numerous. Capsule ovoid-oblong, acute or subacute, bisulcate, loculicidal and septicidal. Seeds small, striate-rugose; embryo straight or slightly curved; cotyledons ovate.—Herbs or shrubs often viscous. Leaves alternate, quite entire. Flowers sessile or shortly stalked, axillary or the upper in a terminal raceme or spike; pedicels usually minutely bibracteolate.

Species 7, all, except the following, natives of extra-tropical South Africa.

An undershrub, often procumbent at the base; branches covered with a whitish corky layer at the base .	1. *P. leucorrhizum.*
A perennial herb, erect; branches without a whitish corky layer	2. *P. Lugardæ.*

1. **P. leucorrhizum,** *E. Meyer ex Benth. in Bot. Reg. sub t.* 1882. A rigid much-branched nearly glabrous undershrub 3–12 in. high or more, often covered on the bases of the branches, stem and on the frequently much-thickened rootstock with a whitish corky layer; primary stem erect or procumbent; branches slender, woody at the base. Leaves linear-lanceolate, linear-obovate or linear, $1\frac{1}{2}$–12 lin. long, obtuse, fleshy, glabrous or minutely puberulous. Flowers axillary. Peduncles $\frac{1}{3}$–$\frac{3}{4}$ lin. long; bracts linear, very small. Calyx-segments 1–$1\frac{1}{2}$ lin. long, narrowly linear, acute, minutely puberulous or glabrous. Corolla sparsely and minutely hairy outside, deep blue; tube about 6 lin. long, nearly straight, tubular-funnel-shaped, about 2 lin. in diam. at the mouth; constricted basal part often longer than the calyx; limb slightly oblique; lobes suborbicular, $1\frac{1}{2}$–2 lin. in diam. Anthers ciliate. Capsule ovoid-oblong, $1\frac{1}{2}$–$2\frac{3}{4}$ lin. long, much longer than the calyx, subobtuse or scarcely acute.—Benth. in DC. Prodr. x. 346; Hiern in Dyer, Fl. Cap. iv. ii. 135.

Mozamb. Dist. Transvaal: Mahilas Kop, 2800 ft., *Schlechter*, 4572 (ex *Hiern*).

Also in South Africa.

Var. *linearifolium,* Weber in Bull. Herb. Boiss. 2me sér. iii. 904. Resembles the type in habit and has the whitish corky layer on the bases of the branches. Leaves narowly linear, 10–12 (rarely 15) lin. long, glabrous. Calyx-segments narrowly linear, $2\frac{1}{2}$–3 lin. long. Capsule only slightly longer than the calyx.—*P. linearifolium,* Schinz ex O. Kuntze, Rev. Gen. Pl. iii. ii. 238.

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Fleck*, 155a Hereroland; Otyimbingue, *Rautanen*, 38, *Lüderitz*, 120,

Fleck, 473; mouth of the Tsoachaub (Swakop) River, *Dinter*, 73; *Nels*, 258; Ozongombo, *Rautanen*, 427.

Also in South Africa.

2. **P. Lugardæ,** *N. E. Brown MSS.* An erect perennial herb 1–1½ ft. high, branching from the base upwards, minutely scaberulous on the green parts. Leaves ascending or spreading, linear, up to 1½ in. long, ¼–1 lin. broad, subacute, tapering at the base into a short petiole. Flowers axillary along the terminal parts of the branches. Peduncles ¾–1 lin. long. Calyx-segments 2½–3 lin. long, ¼ lin. broad, narrowly linear, acute. Corolla very sparsely and minutely hairy outside, bluish-mauve with a darker spot at the base of each lobe and veined with mauve on a white ground in the throat (*Lugard*); tube 4½ lin. long, slightly curved, funnel-shaped, about 2 lin. in diam. at the mouth; constricted basal part much shorter than the calyx; limb oblique; lobes suborbicular, the lower about 2 lin. long and broad, the others about 1½ lin. in diam. Filaments glabrous; anthers minutely pubescent. Capsule ovoid-oblong, 2½–2¾ lin. long, slightly longer than the calyx, subobtuse.

Mozamb. Dist. British Central Africa: Ngamiland; Kwebe Hills, 3400 ft., *Mrs. Lugard*, 124!

3. **ANTICHARIS,** Endl.; Benth. et Hook. f. Gen. Pl. ii. 928.

Calyx 5-partite; segments narrow, subvalvate. Corolla-tube dilated above; limb spreading; lobes 5, flat, subequal, rounded, the two posticous lobes outside. Stamens 2, anticous; filaments filiform; anthers subtransverse, glabrous or sparingly pilose, 1-celled by confluence, horse-shoe- or half-moon-shaped before dehiscence, at length flattened out; staminodes 0. Style filiform, subclavate at the apex; stigma obtuse, entire or emarginate. Capsule ovate or oblong, subacuminate, 2-furrowed, loculicidal and septicidal; valves bent inwards at the margins exposing the placentiferous column. Seeds numerous, small, oblong or obovoid, striate; embryo straight; cotyledons ovate. —Dwarf erect herbs with glandular pubescence. Leaves entire. Peduncles axillary, solitary, 1-flowered, often with 2 small bracts.—*Meisarrhena*, R. Br. in Salt, Abyss. App. 63, name only. *Doratanthera*, Benth. in Endl. Gen. 685. *Gerardiopsis*, Engl. Pfl. Ost-Afr. C. 359, and in Engl. Jahrb. xxiii. 507. *Distemon*, Ehrenb. & Hempr. ex Aschers. in Monatsber. Akad. Wiss. Berlin, 1866, 880.

Species 9, 8 in Tropical Africa, 2 of which extend to Arabia and Western India, and 1 in South Africa.

Anthers free.

Bracts inserted above the middle of the peduncle; basal lobes of the anthers acuminate; leaves linear, acuminate	1. *A. linearis.*
Bracts inserted at or below the middle of the peduncle; basal lobes of the anthers obtuse; leaves linear-lanceolate to oblong or elliptic.	
Leaves often narrow, rather acute; capsule twice as long as the calyx	2. *A. arabica.*

Leaves often broad, rather obtuse; capsule $1\frac{1}{2}$ times as long as the calyx	3. *A. glandulosa.*
Anthers coherent towards the apex.	
Peduncles without bracts	4. *A. ebracteata.*
Peduncles with bracts.	
Leaves crowded and imbricate	5. *A. imbricata.*
Leaves more or less distant.	
Peduncles much longer than the flowers	6. *A. aschersoniana.*
Peduncles as long as or shorter than the flowers.	
Leaves oblong, $\frac{3}{4}$–1 in. long, about 5 lin. broad; peduncles about $2\frac{1}{2}$ lin. long	7. *A. inflata.*
Leaves narrowly linear, $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad; peduncles about 5 lin. long	8. *A. longifolia.*

1. **A. linearis,** *Hochst. ex Aschers. in Monatsber. Akad. Wiss. Berl.* 1866, 882. An erect much-branched glandular-pubescent annual, a few inches to more than a foot high, usually becoming blue-black in drying. Leaves up to 2 in. long, 1–$1\frac{3}{4}$ lin. broad, sessile, linear to narrow, lanceolate, acute, attenuated at the base, sometimes glabrescent. Peduncles 3–7 (usually 6) lin. long; bracts 1–$1\frac{1}{2}$ lin. long, opposite or subopposite, subulate, usually inserted above the middle of the peduncle. Calyx about 3 lin. long, deeply cleft; segments $\frac{1}{3}$ lin. broad, linear, shortly acuminate. Corolla about 5 lin. long; lobes subequal. Anthers free, ciliate; basal lobes acuminate. Style shorter than the corolla-tube; stigma bifid. Capsule $3\frac{1}{2}$–$4\frac{1}{4}$ lin. long, nearly twice as long as the calyx, ovoid, acuminate or beaked.—Vatke in Oest. Bot. Zeitschr. 1875, 9; Hiern in Cat. Afr. Pl. Welw. i. 756; Hook. f. Fl. Brit. Ind. iv. 250; Boiss. Fl. Orient. iv. 423; Almagià in Ann. Istit. Bot. Roma, viii. 136. *A. arabica,* Hochst. ex Benth. in DC. Prodr. x. 347; A. Rich. Tent. Fl. Abyss. ii. 119; Schweinf. Beitr. Fl. Aethiop. 98, not of Endl. *Doratanthera linearis,* Benth. in DC. Prodr. x. 347; Oliver in Trans. Linn. Soc. xxix. 120; Schweinf. Beitr. Fl. Aethiop. 241. *Distemon angustifolius,* Ehrenb. & Hempr. ex Aschers. l.c. 883. *Gerardiopsis Fischeri,* Engl. Pfl. Ost-Afr. C. 359, and in Engl. Jahrb. xxiii. 507.

Upper Guinea. Bornu: Kuka, *Vogel,* 11! Senegambia, *Leprieur!* Senegal, *Perrottet!*

Nile Land. Nubia: coast region, *Bent!* bank of the Nile north of Khartoum, *Speke & Grant!* between Suakin and Berber, *Schweinfurth,* 445! 460! Kordofan; near Obeid, *Clenkowsky,* Mount Arashkol, *Kotschy,* 59! 90! Bara, *Pfund,* 687! Darfur, *Purdy,* 16! Eritrea: near Saati, *Schweinfurth & Riva,* 370! Samhar, near Massowa, *Hildebrandt,* 726! Habab, *Hildebrandt,* 673, Abyssinia: Modat, near Ailet, *Schimper,* 1050! mountains near Gageros, 4000 ft., *Schimper,* 2264!

Mozamb. Dist. German East Africa: Kilimanjaro; Lake Chala, 3300 ft., *Volkens,* 333; and without precise locality, *Fischer,* 119.

Lower Guinea. Angola: Mossamedes; Praia da Amelia and about Santo Antonio, *Welwitsch,* 5810!

Also in the Cape Verde Islands, Egypt, and through Arabia to Western India.

2. **A. arabica,** *Endl. Nov. Stirp. Dec.* 23. A slender erect branched shortly glandular-pubescent annual about 1 ft. high. Leaves up to 14 lin. long, $1\frac{1}{4}$–$2\frac{1}{4}$ lin. broad, oblong-lanceolate to lanceolate-linear,

acute or somewhat acute, attenuated to the base; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Peduncles $2\frac{1}{2}$–4 lin. long; bracts minute, subulate, inserted at about the middle of the peduncle. Calyx 1–$1\frac{1}{2}$ lin. long, deeply cleft; segments about $\frac{1}{2}$ lin. broad, linear or oblanceolate, acute. Corolla rose-coloured, somewhat viscid, $3\frac{1}{2}$ lin. long; lobes broad, rounded. Anthers free, pilose on the back; basal lobes unequal. Style shorter than the corolla-tube. Capsule twice as long as the calyx, narrowly ovoid, acuminate or beaked.—Endl. Iconogr. t. 93; Benth. in DC. Prodr. x. 347; Aschers. in Monatsber. Akad. Wiss. Berlin, 1866, 881; Boiss. Fl. Orient. iv. 422; Almagià in Ann. Istit. Bot. Roma, viii. 137. *A. glandulosa*, var. *intermedia*, Terracciano in Ann. Istit. Bot. Roma, v. 103. *A. Schimperi*, Endl. Iconogr. xv., name only. *Capraria arabica*, Steud. & Hochst. ex Benth. in DC. Prodr. x. 347. *Distemon campanularis*, Ehrenb. & Hempr. ex Aschers. l.c. 882.

Nile Land. Nubia: Mount Uaratab, near Suakin, *Schweinfurth*, 151; Etbai, on Mount Soturba, near Cape Elba, *Schweinfurth*, 157; Wadi O-Mareg, *Schweinfurth*, 702! Eritrea: Ferehan Volcano, *Terracciano*; Hauakel Island, near Massowa, *Ehrenberg & Hemprich*. Somaliland, *Miss Edith Cole!*

Also in Socotra and Arabia.

3. **A. glandulosa,** *Aschers. in Monatsber. Akad. Wiss. Berlin*, 1866, 880. A densely long-glandular-hispid diffusely branched annual 6–9 in. high. Leaves up to 8 lin. long, 2–3 lin. broad, spathulate-oblong, oblong or oval, obtuse, attenuated at the base; petiole 2–4 lin. long. Peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long; bracts 1–$1\frac{1}{2}$ lin. long, opposite or subopposite, subulate, inserted near the middle of the peduncle. Calyx $2\frac{1}{2}$ lin. long, deeply cleft; segments $\frac{1}{2}$ lin. broad, linear or oblanceolate, acute. Corolla rose-coloured, 4–5 lin. long; lobes broad, subequal. Anthers free, sparingly hairy on the back. Style shorter than the corolla; stigma capitate. Capsule 3–$3\frac{1}{4}$ lin. long, about $1\frac{1}{2}$ times as long as the calyx, narrowly ovoid, acuminate.—Vatke in Oest. Bot. Zeitschr. 1875, 9; Hook. f. Fl. Brit. Ind. iv. 249; Boiss. Fl. Orient. iv. 423; Penzig in Atti Congr. Bot. Internaz. Genova, 1892, 352. *Meisarrhena tomentosa*, R. Br. in Salt, Abyss. App. 63, name only. *Distemon glandulosus*, Ehrenb. & Hempr. ex Aschers. l.c. 881.

Nile Land. Eritrea: Saati, *Penzig*. Abyssinia: without precise locality, *Salt!* Somaliland: Dobar Waina, 500 ft., *Miss Edith Cole!* Ahl Mountains, near Lasgosi, *Hildebrandt*, 862!

Also in Egypt, Arabia, and Western India.

4. **A. ebracteata,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 187. A densely glandular-pubescent undershrub. Leaves 7 lin. long, $1\frac{1}{2}$–2 lin. broad, sessile or shortly petiolate, narrowly lanceolate, acute or obtuse, attenuated at the base. Peduncles $1\frac{1}{2}$–2 lin. long; bracts 0. Calyx $1\frac{1}{2}$ lin. long, deeply cleft; segments linear-lanceolate. Corolla 6 lin. long, glandular-pubescent outside; lobes $2\frac{1}{4}$ lin. long, 2 lin. broad. Filaments $1\frac{1}{2}$–2 lin. long; anthers long, coherent, with a tuft of hairs

at the apex. Ovary conical, acute; style slightly longer than the stamens.

Lower Guinea. German South-west Africa: Hereroland, *Lüderitz.*

5. **A. imbricata,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 187. A densely glandular-pubescent undershrub. Leaves $2\frac{1}{2}$–5 lin. long, $3\frac{1}{2}$–6 lin. broad, crowded, completely concealing the branches, imbricate, broadly ovate, slightly cordate at the base, acute, sessile. Peduncles scarcely more than 1 in. long; bracts 1 lin. long, subulate, inserted at the middle of the peduncle. Calyx 3–$3\frac{1}{2}$ lin. long, deeply cleft; segments linear or linear-lanceolate, slightly unequal, shortly acuminate. Corolla $\frac{2}{3}$ in. long, sparingly glandular-pubescent outside. Anthers coherent, with a tuft of hairs at the apex. Style exserted; stigma capitate. Capsule $1\frac{1}{2}$ lin. longer than the calyx, narrow-ovoid, acuminate or beaked.

Lower Guinea. German South-west Africa: Hereroland; Omaruru, *Schinz,* 744! and without precise locality, *Lüderitz, Schenck,* 434.

6. **A. aschersoniana,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 188. A decumbent slender much-branched glandular-pubescent annual from a few inches to 1 or 2 ft. high, usually becoming black in drying. Leaves 1–$1\frac{1}{4}$ in. long, 4–5 lin. broad, narrow-oblanceolate or lanceolate to linear, acute, attenuated at the base. Peduncles 12–14 lin. long, slender; bracts 1–2 lin. long, subulate, usually opposite, inserted below the middle of the peduncle (about 4 lin. from the base). Calyx about $2\frac{1}{2}$ lin. long; segments linear, shortly acuminate, subequal. Corolla $\frac{2}{3}$–$\frac{3}{4}$ in. long, sparingly pilose on the outside; lobes 2 lin. long, 2–$2\frac{1}{2}$ lin. broad. Anthers coherent, ciliate. Capsule somewhat longer than the calyx, narrow-ovoid, slightly contracted near the apex.—Hiern in Cat. Afr. Pl. Welw. i. 756.

Lower Guinea. Angola: Mossamedes; banks of the River Bero, *Welwitsch,* 5815! near Mata dos Carpenteiros, *Welwitsch,* 5814! and without precise locality, *Newton.*

Welwitsch 5814 has less spreading branches, longer and narrower leaves, and the bracts inserted above the middle of the pedunele.

7. **A. inflata,** *Marl. & Engl. in Engl. Jahrb.* x. 251. A glandular-pubescent annual about 5 in. high; stem simple, densely leafy. Leaves $\frac{3}{4}$–1 in. long, about 5 lin. broad, oblong, somewhat obtuse; petioles of the lower leaves 5–$7\frac{1}{2}$ lin. long, of the upper leaves shorter. Peduncles about $2\frac{1}{2}$ lin. long, slender; bracts linear, very slender. Calyx-segments $2\frac{1}{2}$ lin. long, about $\frac{1}{2}$ lin. broad, linear-lanceolate, acute. Corolla-tube 5–7 lin. long, curved forwards, pale blue with dark violet spots on the inside at the back; lobes about $1\frac{1}{2}$ lin. broad, suborbicular, blue, dark violet at the base. Filaments about 5 lin. long, twisted at the apex; anthers oblong-linear, curved, coherent and ciliate at the apex. Style longer than the stamens. Capsule oblong-ovoid, acute. Seeds ovoid, longitudinally many-winged.

Lower Guinea. German South-west Africa: Hereroland; Usakos, 2950 ft., *Marloth,* 1483.

8. **A. longifolia,** *Marl. & Engl. in Engl. Jahrb.* x. 252. An erect branched herb about 1½ ft. high, everywhere covered with short glandular hairs; branches 12–16 in. long, ascending. Leaves 1½–2 in. long, ½–¾ lin. broad, narrowly linear, somewhat acute, rather distant. Peduncles about 5 lin. long, slender; bracts small, linear. Calyx-tube very short; segments 2 lin. long, ¼ lin. broad, lanceolate, acute. Corolla ½ in. long, blue with a dark-violet throat; tube campanulate, oblique in the upper part; lobes short, suborbicular. Stamens slightly shorter than the corolla-tube; anthers curved, coherent, and ciliate at the apex. Style longer than the stamens. Capsule ⅓ in. long, oblong, conically attenuated. Seeds ovoid, obtuse at both ends, with many longitudinal ridges.

Lower Guinea. German South-west Africa: Hereroland; Usakos, 2950 ft., *Marloth,* 1422.

4. **VERBASCUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 928.

Calyx deeply 5-lobed or -partite, rarely 5-toothed; lobes imbricate. Corolla rotate, rarely concave, with scarcely any tube; lobes 5, broad, slightly unequal, the posticous outside. Stamens 5, affixed to the base of the corolla; filaments of the 3 posticous stamens or of all bearded; anthers transverse or oblique, 1-celled by confluence. Style entire, compressed, dilated at the apex. Capsule globose, oblong or ovoid, septicidally 2-valved; valves usually 2-lobed, with inflexed margins exposing the placentiferous column. Seeds many, ovoid or oblong, rugose, wingless; embryo straight.—More or less tomentose biennial or perennial herbs, or sometimes undershrubs. Leaves alternate, usually soft, entire, crenulate, sinuate-dentate or pinnatifid. Flowers in simple or branched terminal spikes or racemes; pedicels usually very short, ebracteolate, solitary or fascicled. Corolla yellow, fuscous, purple or red, more rarely white.

Species about 160, chiefly in Europe, North Africa, West and Central Asia. The following belong to the section *Lychnitis.*

Plant densely covered with a woolly tomentum . .	1. *V. Ternacha.*
Plant nearly glabrous	2. *V. Schimperi.*

1. **V. Ternacha,** *Hochst. ex A. Rich. Tent. Fl. Abyss.* ii. 108. A biennial 2–3 ft. high or more, densely clothed with pale yellow or whitish woolly tomentum; stem usually simple, erect, thick. Radical and lower cauline leaves up to 9 in. long, petiolate, oval or oblong, subacute or obtuse, crenate or serrate, narrowed at the base; petiole 1–2 in. long, stout; upper leaves much smaller, usually subamplexicaul, acute or acuminate, more or less crenate or serrate. Panicle 18 in. long or more, branched in the lower part; branches 6–12 in. long, spreading; bracts ¼–⅓ in. long, ovate, acuminate. Flowers usually in small rather distant groups; pedicels about 2 lin. long. Calyx 2½–3 lin. long, deeply cleft; segments lanceolate or narrow-ovate, acute or acuminate. Corolla ¾ in. in diam., yellow, tomentose outside. Filaments all bearded; anthers reniform. Capsule 3½ lin. long, ovoid, tomentose or here and

there glabrescent.—Schweinf. Beitr. Fl. Aethiop. 101; Vatke in Oest. Bot. Zeitschr. 1875, 9, and in Linnæa, xliii. 305; Engl. Hochgebirgsfl. Trop. Afr. 375; Almagià in Ann. Istit. Bot. Roma, viii. 135. *V. somaliense*, Baker in Kew Bulletin, 1895, 222.

Nile Land. Nubia: near New Dongola, *Ehrenberg*. Darfur, *Purdy*, 117! Eritrea: various localities, *Schweinfurth & Riva*, 1314! 873! 732! *Hildebrandt*, 446; *Rohlfs & Stecker*. Abyssinia: mountains near Jelajeranne, *Schimper*, 621! Jaja, *Schimper*, 307. Harre-Schoa, *Schimper*, 676; and without precise locality, *Schimper*, 845! Somaliland: Serrut Mountains, near Maid, *Hildebrandt*, 1408! Golis Range, *Miss Edith Cole! Mrs. Lort Phillips!*

V. erianthum, Benth. ex A. Rich. Tent. Fl. Abyss. ii. 108 (Wajerat, *Petit*), is probably not distinct from the above species. I have seen no African specimens, and can find nothing in Richard's description by which to satisfactorily distinguish it.

2. **V. Schimperi,** *Skan*. An erect biennial 10–18 in. high; stem simple or divided from the base, obscurely quadrangular, glabrous, or sparingly hairy in places, subglaucous. Leaves glabrous or with a few short hairs here and there on some of the nerves; radical and lower cauline leaves up to 4 in. long, interruptedly pinnatifid, some of the segments very small, the terminal much the largest, elliptic or oblong and irregularly crenate-dentate; petioles rather long near the base of the stem; becoming shorter above; upper leaves $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–1 in. wide, sessile, elliptic, oblong or narrow-ovate, acute, cordate at the base, irregularly crenate-dentate. Raceme up to 10 in. long, unbranched; bracts about $\frac{1}{2}$ in. long, serrate, acuminate, cordate at the base; flowers solitary, rather distant (usually about $\frac{1}{2}$ in. apart), occasionally subopposite; pedicels $1\frac{1}{4}$–$2\frac{1}{2}$ lin. long, stout, glandular-pubescent Calyx $2\frac{1}{2}$–3 lin. long at the flowering stage, accrescent, deeply cleft, sparingly glandular-pubescent on the outside; segments $1\frac{1}{2}$–2 lin. broad, broadly lanceolate or elliptic, slightly unequal, acute, distinctly and somewhat irregularly serrate. Corolla scarcely longer than the calyx, yellow. Filaments all bearded; anthers all reniform, and transverse, the uppermost smallest of all. Capsule rather longer than the calyx, broadly ovoid,—*Celsia scrophulariæfolia*, Engl. Hochgebirgsfl. Trop. Afr. 376, partly, not of Hochst.

Nile Land. Abyssinia: Begemeder; Debra Tabor, 9200 ft., *Schimper*, 1398!

5. **CELSIA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 929.

Calyx deeply 5-lobed or 5-partite; lobes imbricate. Corolla rotate, with scarcely any tube; lobes 5, broad, slightly unequal, the posticous lobe outside. Stamens 4 (the fifth entirely wanting), didynamous or subequal, affixed to the base of the corolla; filaments of the posticous stamens or of all bearded; anthers transverse or oblique, 1-celled by confluence. Style entire, compressed, dilated at the apex. Capsule globose or ovoid, septicidally 2-valved; valves usually bifid, with inflexed margins exposing the placentiferous column. Seeds many, very small, transversely rugose, wingless.—Biennial or perennial herbs, with the habit of *Verbascum*, woolly or glabrous. Leaves alternate, crenate,

sinuate-dentate, pinnatifid or dissected. Racemes or spikes terminal, simple or more rarely branched. Corolla yellow, purple or red.

Species about 40, natives of Southern Europe, Northern and Tropical Africa, Western Asia and Eastern India.

C. parvifolia, Engl. in Engl. Jahrb. x. 252 is *Alectra parvifolia*, Schinz.

Leaves all distinctly pinnate or rarely simple; stem herbaceous; bracts broad at the base.
- Leaves often with large stipule-like auricles; bracts scarcely cordate; pedicels 9–10 lin. long . . 1. *C. interrupta.*
- Leaves not auricled; bracts (lower ones at least) cordate; pedicels 3–6 lin. long . . . . 2. *C. valerianæfolia.*

Leaves all simple or rarely a few pinnate; stem woody.
- Leaves glabrous or very shortly pubescent; inflorescence quite glabrous and smooth . . . 3. *C. pedunculosa.*
- Leaves densely covered with long soft hairs; inflorescence scabrid . . . . . 4. *C. sedgwickiana.*

Leaves all simple; stem woody or herbaceous.
- Branches often spinescent; pedicels persistent and spinescent . . . . . 5. *C. arbuscula.*
- Branches and pedicels not spinescent.
  - Bracts less than half as long as the pedicels; pedicels long and slender; plant rather slender, diffusely branched.
    - Bracts 4–5 lin. long, 2–4 lin. broad; leaves more or less floccose-tomentose.
      - Capsule ovoid, scarcely longer or shorter than the calyx . . . . . 6. *C. floccosa.*
      - Capsule globose, twice as long as the calyx . 7. *C. affinis.*
    - Bracts $1\frac{1}{4}$–3 lin. long, about $\frac{1}{2}$ lin. broad; leaves very shortly hairy, not floccose-tomentose . 8. *C. scabrida.*
  - Bracts from half as long as to longer than the pedicels; pedicels short and stout; plant rather stout, unbranched or sparingly branched.
    - Bracts nearly as long as or longer than the pedicels; calyx-segments 3–$4\frac{1}{2}$ lin. long.
      - Leaves very much crowded, up to $2\frac{1}{4}$ in. long and $6\frac{1}{2}$ lin. broad, distinctly rugose. 9. *C. densifolia.*
      - Leaves not crowded, up to 5 in. long and $1\frac{1}{2}$ in. broad, not rugose. . . . 10. *C. scrophulariæfolia.*
    - Bracts only half as long as the pedicels; calyx-segments $2\frac{1}{2}$ lin. long . . . . 11. *C. brevipedicellata.*

1. **C. interrupta,** *Fresen. in Flora*, 1838, 605. A slender biennial about 2 ft. high, glabrous on the stem and leaves, sprinkled with minute pale yellow, very shortly stalked glands on the inflorescence; stem simple, striate, herbaceous. Leaves interruptedly pinnate or very irregularly pinnatisect, up to 4 in. long; larger segments oblong-lanceolate, the terminal one only a little larger than the largest lateral, irregularly dentate; lateral segments sometimes very narrow, often reduced to mere teeth a line or two long; petioles of the upper leaves with semi-amplexicaul dentate or incised stipule-like appendages at the base. Panicle nearly 1 ft. long, sparingly branched at the base; bracts $\frac{1}{3}$ in. long, ovate to lanceolate, acuminate, scarcely cordate at the base, some-

times obscurely few-toothed in the broadest part; pedicels 9–10 lin. long, ascending. Calyx $3\frac{1}{4}$ lin. long; segments lanceolate, acuminate, $\frac{3}{4}$ lin. broad. Corolla yellow, $\frac{2}{3}$–$\frac{3}{4}$ in. in diam. Capsule (immature) subglobose, glabrous, much shorter than the calyx.—Benth. in DC. Prodr. x. 246, partly; A. Rich. Tent. Fl. Abyss. ii. 111, partly? Engl. Hochgebirgsfl. Trop. Afr. 375, partly.

Nile Land. Abyssinia: Samen, *Rüppel*, and without precise locality, *Schimper*, 521!

2. **C. valerianæfolia,** *A. Rich. Tent. Fl. Abyss.* ii. 112. A slender biennial, $1\frac{1}{2}$–3 ft. high, glabrous or more or less glandular-hairy; stem erect, branched, herbaceous. Leaves interruptedly pinnate or sometimes simple, up to 5 in. long; pinnate leaves 4–5 in. long; terminal leaflet about 2 in. long and $1\frac{1}{4}$ in. broad, ovate or elliptic, irregularly crenate-dentate; lateral leaflets $\frac{1}{6}$–1 in. long, crenate-dentate, sessile with a broad base or shortly stalked and cuneate at the base; simple leaves elliptic or oblong, less than 1 in. long, sessile or shortly petiolate, more or less toothed. Raceme simple or with ascending branches; bracts cordate at the base, acuminate, $2\frac{1}{2}$–3 lin. long, obscurely toothed; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long, glandular-hairy. Calyx $2\frac{1}{4}$–3 lin. long, minutely glandular-hairy outside; segments oblong-lanceolate or elliptic, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, acute. Corolla yellow, 6–7 lin. in diam. Filaments all bearded; anthers of the shorter stamens reniform, transverse, and of the longer somewhat oblique. Capsule subglobose, $3\frac{1}{4}$–4 lin. long.—Engl. Hochgebirgsfl. Trop. Afr. 376. *C. interrupta,* Benth. in DC. Prodr. x. 246, partly; A. Rich. Tent. Fl. Abyss. ii. 111, partly? Engl. Hochgebirgsfl. Trop. Afr. 375, partly, not of Fresen.

Nile Land. Abyssinia: Tigre; Shireh, *Petit*; on the Jogarti, *Schimper*, 514! near Memsach, *Quartin-Dillon*; Besa, 5500 ft., *Schimper*, 94!

3. **C. pedunculosa,** *Steud. & Hochst. ex Benth. in DC. Prodr.* x. 245. A slender divaricately branched scantily-leaved undershrub; branches minutely puberulous. Leaves simple, or rarely with 1 or 2 minute segments on the petiole just below the blade, petiolate except a few sessile small entire upper ones, minutely puberulous chiefly on the nerves on the underside, crenate or irregularly crenate-dentate, narrowly ovate to oblong, $\frac{1}{2}$–$1\frac{3}{4}$ in. long, obtuse or acute. Panicle lax, usually much branched; bracts $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, lanceolate to ovate-lanceolate, acute, slightly attenuated at the base, glabrous or with a few minute hairs; pedicels $\frac{2}{3}$–1 in. long, glabrous or nearly so. Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, glabrous or subglabrous; segments oblong-lanceolate or oblong, acute. Corolla about 7 lin. in diam., yellow. Capsule $\frac{1}{2}$ lin. longer than the calyx, ovoid, glabrous.—A. Rich. Tent. Fl. Abyss. ii. 111. *C. interrupta,* var. *pedunculosa,* Vatke in Engl. Hochgebirgsfl. Trop. Afr. 375, partly.

Nile Land. Eritrea: Dongherghera; Mount Bizen, 6560 ft., *Schweinfurth & Riva*, 1867! Hamasen; Sasaga, *Steudner*, 814. Abyssinia: Tigre; Mount Semayata, *Schimper*, 222! Abba-Matha, *Schimper*, 500!

Var. *pubescens,* Skan. Leaves often (always?) pinnate, up to $3\frac{1}{2}$ in. long, with a large terminal leaflet and 1–3 distant pairs of small shortly stalked lateral ones,

densely and very shortly pubescent; terminal leaflet oblong, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, $3\frac{1}{2}$–10 lin. broad; lateral leaflets similar in shape, $3\frac{1}{2}$–7 lin. long, $1\frac{1}{4}$–$2\frac{3}{4}$ lin. broad; petiole up to 13 lin. long. Calyx-segments narrowly oblong.

Nile Land. Abyssinia, without precise locality, *Schimper*, 347 !

4. **C. sedgwickiana,** *Schimper ex Engl. Hochgebirgsfl. Trop. Afr* 376 (*without description*). An undershrub with rather long slender sparingly leafy branches pilose below, glandular-pubescent and very scabrid above and on the pedicels. Leaves elliptic, about $1\frac{1}{4}$ in. long and $\frac{1}{2}$–$\frac{3}{4}$ in. broad, rather densely covered with long soft hairs, irregularly lobed or dentate or some lyrately pinnate, obtuse, narrowed at the base into a short petiole, some much reduced and sessile. Flowers in terminal racemes 4–9 in. long; bracts broadly to narrowly ovate, the lower toothed, the upper entire, acute, $1\frac{1}{4}$–$2\frac{1}{2}$ lin. long, densely covered with sessile glands; pedicels 5–9 lin. long. Calyx-segments elliptic-lanceolate, $1\frac{1}{2}$ lin. long, acute, densely covered with sessile glands. Corolla wanting. Capsule broadly ovoid, glabrous, $2\frac{1}{2}$ lin. long.

Nile Land. Abyssinia: Begemeder; on perpendicular rock-walls in Geat Ravine, 8500 ft., *Schimper*, 661 !

5. **C. arbuscula,** *A. Rich. Tent. Fl. Abyss.* ii. 110. A very much branched shrub; stem floccose-tomentose; branches sometimes spinescent. Leaves rather small, obovate, obtuse, narrowed at the base, subsessile, obtusely-dentate, everywhere hairy. Pedicels straight, rigid, persistent, spinescent at the apex. Calyx-segments narrow-lanceolate, scarcely acute, glandular-dentate. Capsule ovoid-oblong, acute, bifid.

Nile Land. Abyssinia: Shoa, *Petit*.

6. **C. floccosa,** *Benth. in DC. Prodr.* x. 245. An undershrub 2–3 ft. high, densely tomentose on the leaves and lower part of the stem, glandular-hairy on the upper part of the stem, on the pedicels, bracts, calyx and capsule. Leaves 2–3 in. long, $\frac{3}{4}$–1 in. broad, oblong-lanceolate, acute, cordate or subtruncate at the base, serrate-crenate, slightly rugose on the upper side, shortly petiolate, the upper sessile. Raceme 9–12 in. long, lax, sparingly branched at the base; bracts 4–5 lin. long, 2–4 lin. broad, ovate, acuminate, more or less dentate; pedicels stout, 1–$1\frac{1}{4}$ in. long. Calyx 3 lin. long; segments $\frac{3}{4}$–1 lin. broad, oblong or elliptic, acute. Corolla 1 in. or more in diam., apparently yellow. Filaments of the shorter stamens very hairy, of the longer hairy only a little at the base; anthers of the shorter stamens reniform, transverse, of the longer oblong and parallel to the filaments. Capsule slightly longer than the calyx, ovoid, obtuse.—A. Rich. Tent. Fl. Abyss. ii. 109; Engl. Hochgebirgsfl. Trop. Afr. 375; Engl. Pfl. Ost-Afr. C. 356. *C. tomentosa*, Hochst. ex Benth. in DC. Prodr. x. 245.

Nile Land. Abyssinia: Samen; Mount Aber near Jenausa, *Schimper*, 853 ! near Ghaba, *Steudner*, 810 ! Ataba River, *Steudner*, 813; Bellaka, *Schimper*, 330; and without precise locality, *Schimper*, 52 !

Mozamb. Dist. German East Africa: Kilimanjaro, 9800 ft., *Meyer*, 105.

7. **C. affinis,** *A. Rich. Tent. Fl. Abyss.* ii. 110. An erect branched undershrub; stem covered with whitish-floccose tomentum. Cauline leaves petiolate, oval, subacute, cordate at the base, doubly dentate-crenate, everywhere (especially on the underside) covered with whitish-floccose tomentum. Bracts cordate, dentate. Pedicels and calyx glandular-pubescent. Capsule twice as long as the calyx, globose, apiculate, glabrous.

Nile Land. Abyssinia: Shoa; on mountains near Tinglete, *Petit.*

8. **C. scabrida,** *Skan.* A branched undershrub up to $2\frac{1}{2}$ ft. high, with stems and leaves minutely hispid-hairy, and inflorescence densely covered with small scabrid and glandular hairs. Leaves simple or rarely pinnate, petiolate or the uppermost subsessile, blade (or terminal leaflet) 2–$3\frac{1}{2}$ in. long, sometimes much shorter, 7–12 lin. broad, dentate-crenate to denticulate, acute, somewhat cuneate at the base; lateral leaflets few, small, often minute. Panicle 9–12 in. long; bracts $1\frac{1}{2}$–3 lin. long, about $\frac{1}{2}$ lin. broad, lanceolate to ovate-lanceolate, acuminate; pedicels 5–8 lin. long. Calyx $2\frac{1}{4}$–3 lin. long; segments linear to linear-oblong, acute. Corolla about $\frac{3}{4}$ in. in diam., yellow. Filaments all bearded; anthers of the shorter stamens transverse, of the longer oblique. Style 5–7 lin. long. Capsule shorter to slightly longer than the calyx, subglobose, glabrous.—*C. interrupta,* Engl. Hochgebirgsfl. Trop. Afr. 375, partly, not of Fresen. *C. interrupta,* var. *pedunculosa,* Engl. l.c., partly, not of Vatke.

Nile Land. Abyssinia: Gondar, 6000–7000 ft., *Schimper,* 1392! Bambulo, *Steudner,* 812! and without precise locality, *Plowden!*

9. **C. densifolia,** *Hook. f. in Journ. Linn. Soc.* vii. 208. Stem erect, branched at the base, pubescent-tomentose, straight, stout. Leaves crowded, $1\frac{1}{4}$–$2\frac{1}{4}$ in. long, $3\frac{1}{2}$–7 lin. broad, oblong-lanceolate, crenulate-denticulate, rather acute, the lowermost shortly petiolate, densely and shortly tomentose below, sparingly pubescent and more or less rugose above; upper leaves smaller, oblong-lanceolate to ovate, sessile. Raceme 1-2 ft. long, unbranched, glandular-pubescent; bracts ovate, acuminate, denticulate, nearly as long as the fruit-bearing pedicels; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx-segments $\frac{1}{4}$ in. long, oblong-lanceolate or lanceolate, acuminate, sometimes with a few small teeth. Corolla $\frac{1}{2}$–$\frac{2}{3}$ in. in diam. Filaments all bearded; anthers of the longer stamens oblique. Capsule $1\frac{1}{2}$ lin. longer than the calyx, oblique, ovoid.

Upper Guinea. Fernando Po, 8500 ft., *Mann,* 1453!

A specimen from the Cameroon Mountain (*Johnston,* 9) appears to be a form of this. It has much less crowded leaves, which are not rugose on the upper-side, nor so densely tomentose on the under-side, and somewhat longer pedicels.

10. **C. scrophulariæfolia,** *Hochst. in A. Rich. Tent. Fl. Abyss.* ii. 112. An erect biennial up to $2\frac{1}{2}$ ft. high or more, more or less covered with short greyish sometimes glandular hairs. Leaves up to 5 in. long and $1\frac{1}{2}$ in. broad, oblong or oblong-lanceolate, obtuse, acute or acuminate, truncate at the base, irregularly crenate-dentate or incised,

more or less shortly tomentose on the underside, the lower leaves petiolate sometimes pinnate with very small lateral leaflets, the upper leaves smaller, sessile and cordate at the base. Raceme 12–18 in. long, simple or branched; bracts broadly cordate, irregularly dentate, acuminate, longer than the pedicels; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in. long; flowers very large. Calyx 4–5 lin. long; segments lanceolate, acute or acuminate, sometimes slightly toothed near the apex. Corolla yellow. Filaments all bearded; anthers reniform. Capsule as long as or slightly shorter than the calyx, glabrous, obovoid.—Engl. Hochgebirgsfl. Trop. Afr. 376, partly.

Nile Land. Abyssinia: Samen; Mount Aber near Jenausa, 9000–10000 ft., *Schimper*, 2077! Begemeder; Reb Valley, *Schimper*, 1400! and without precise locality, *Schimper*, 866! 869! Uganda, 7000–9600 ft.: between Eldama Ravine and upper Mau plateau, *Whyte!* upper Mau plateau, *Whyte!* Ruwenzori; Kivata, *Scott-Elliot*, 7723!

11. **C. brevipedicellata,** *Engl. Hochgebirgsfl. Trop. Afr.* 376. Stem rather more than a yard high, simple, erect, leafy, sparingly pilose; lower internodes $1\frac{1}{2}$–2 in. long, the upper $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves oblong, obtuse, rounded at the base, biserrate, thinly pilose on the underside; lower leaves $1\frac{1}{4}$ in. long, 5–$7\frac{1}{2}$ lin. broad, with a slender petiole $\frac{3}{4}$ in. long; upper leaves 5–$9\frac{1}{2}$ lin. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, sessile. Bracts $2\frac{1}{2}$ lin. long, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. broad, lanceolate, irregularly serrate. Pedicels 5 lin. long. Calyx-segments $2\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, linear-lanceolate, acute. Capsule slightly longer than the calyx, ovoid.—Engl. Pfl. Ost.-Afr. C. 356; S. Moore in Journ. Linn. Soc. xxxvii. 189.

Mozamb. Dist. German East Africa: Karagwe; Ruchigga, *Bagshawe*, 409; Kilimanjaro; in a wood by the Mue Brook, 5700–7500 ft., *Meyer*, 286.

A specimen (*Volkens*, 251) received from Berlin under this name has pedicels 7–8 lin. long and calyx-segments only $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long.

6. NEMESIA, Vent.; Benth. et Hook. f. Gen. Pl. ii. 931.

Calyx 5-partite; segments scarcely imbricate. Corolla 2-lipped; upper lip 4-fid; anticous lip entire or emarginate, convex at the base forming a palate; tube produced in front into a single sac or spur. Stamens 4, didynamous; anticous filaments circumflex at the base; anthers 1-celled by confluence, usually cohering in pairs. Style filiform. Ovules numerous in each cell. Capsule compressed contrary to the septum, septicidal; valves boat-shaped, subcarinate, obliquely truncate or rounded at the apex Seeds 1- or 2-seriate, oblong, surrounded by a membranous transparent wing; testa reticulate or granular.—Slender annual or perennial herbs or sometimes undershrubs. Leaves opposite. Flowers racemose at the ends of the branches or more rarely axillary and solitary; pedicels ebracteolate. Corolla yellow, white, violet or variously coloured.

A genus of 49 species, all, except the following, South African.

Corolla with a distinct rather slender spur 1–$2\frac{1}{2}$ lin. long	1. *N. affinis.*
Corolla with a rounded sac 1 lin. broad . . .	2. *N. dentata.*

1. **N. affinis,** *Benth. in Hook. Comp. Bot. Mag.* ii. 21, *excl.* β *and* γ. An erect annual herb up to 1½ ft. high, branched from the base, glabrous below or very sparingly pubescent; stem and branches slender, quadrangular, rather sparingly leafy. Leaves usually opposite, sessile or the lower petiolate, oblong, lanceolate or linear, ¼–1¼ in. long, up to ¼ in. broad, acute or obtuse, denticulate. Racemes terminal, lax, few- or many-flowered, 1–4 in. long; bracts alternate, linear to ovate-lanceolate, 1–4 lin. long; pedicels slender, ⅙–⅔ in. long, more or less glandular-hairy. Calyx-segments linear to narrowly oblong, ¾–1½ lin. long, nearly glabrous or glandular-hairy, obtuse. Corolla glabrous outside, 4–5 lin. long; upper lobes oblong, 1½–3 lin. long; lower lip slightly shorter than the upper; palate bearded; spur conical, 1–2½ lin. long, obtuse. Capsule broadly oblong, 2½–3 lin. long, 2–2½ lin. broad, subtruncate at the apex; valves minutely apiculate.—DC. Prodr. x. 262; Hiern in Dyer, Fl. Cap. iv. ii. 182.

Lower Guinea. German South-west Africa: Great Namaqualand, Rehoboth, *Schinz*, 23!

Also in South Africa.

N. linearis, Vent., var. *denticulata*, O. Kuntze in Jahrb. Bot. Gart. Berlin, iv. 269 (Hereroland, *Pechuel-Loesche*) is unknown to me. The type is confined to eastern and central South Africa.

2. **N. dentata,** *G. Don, Gen. Syst.* iv. 534. An erect herb, annual, leafy at the base, glabrous except the inflorescence, 1½ ft. high, simple up to the inflorescence; upper internodes exceeding the leaves. Leaves opposite, linear, denticulate, 1–2 in. long, ¾–3 lin. broad. Pedicels pubescent, about 5 lin. long. Calyx-segments linear, subobtuse, pubescent, 2½ lin. long. Corolla glandular-puberulous outside, 4 lin. long; the four posticous lobes rounded, 1⅕ lin. long; sac rounded, reaching ¾ lin. below the calyx, 1 lin. broad; anticous lip very broad, as long as the posticous lobes; palate bearded. Stamens glabrous.—*N. monomotapensis*, Benth. in DC. Prodr. x. 264. *Linaria monomotapensis*, Desf. ex Spreng. Syst. ii. 797. *Antirrhinum dentatum*, Poir. Encycl. Suppl. iv. 22.

Mozamb. Dist. Zambesia, *Herb. Sprengel*, 166. Matabeleland; Monomotapa, *Herb. Desfontaines.*

The above description was prepared by Mr. Hiern from a specimen which he saw in the Berlin Herbarium.

7. **DICLIS,** Benth.; Benth. et Hook. f. Gen. Pl. ii. 932.

Calyx 5-partite; segments scarcely imbricate. Corolla 2-lipped; posticous lip 2-fid; anticous lip 3-fid; tube 1-spurred in front. Stamens 4, didynamous; filaments of the anticous pair circumflex at the base; anthers 1-celled by confluence, cohering in pairs. Style minutely stigmatose at the apex. Ovules numerous. Capsule subglobose, emarginate at the apex, loculicidal; valves entire or semi-bifid. Seeds ovoid; testa reticulate-foveolate.—Slender creeping or prostrate herbs, often drying black. Leaves opposite or the upper alternate. Peduncles axillary, solitary, 1-flowered, ebracteate.

Species 7, one occurring in Madagascar, the others in South Africa.

Leaves distinctly petiolate.	
Plant clothed with long soft hairs	1. *D. tenella.*
Plant minutely and sparingly pubescent.	
Peduncles 6–10 lin. long; corolla 2 lin. long .	2. *D. ovata.*
Peduncles 1–2½ in. long; corolla 6 lin. long . .	3. *D. petiolaris.*
Leaves subsessile	4. *D. sessifolia.*

1. **D. tenella,** *Hemsl. in Kew Bulletin*, 1896, 163. A softly hairy much-branched herb; branches very slender, 6–12 in. long, creeping, rooting here and there. Leaves ½–1 in. long and broad, orbicular-ovate, membranous, coarsely serrate-dentate, rounded or subcuneate at the base; petiole ¼–1 in., usually about ½ in. long. Peduncles 1–2 in. long, capillary. Calyx-segments ½–¾ lin. long, unequal, ovate-oblong. Corolla with spur 3–4½ lin. long; spur 2–3½ lin. long, curved; upper lip 2-lobed; lobes rounded; lower lip unequally 3-lobed. Capsule 1½ lin. broad, 2-lobed; lobes rounded.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Chiradzulu, *Whyte!*

2. **D. ovata,** *Benth. in Hook. Comp. Bot. May.* ii. 23. A branched sparingly and minutely hairy annual; branches 3–8 in. long, decumbent or ascending, subquadrangular. Leaves up to 1 in. long by ¾ in. broad, very thin, broadly ovate, acute or minutely apiculate, cuneate at the base, sparingly dentate or denticulate; petiole ⅙-⅓ in. long. Peduncles 6–10 lin. long, filiform, glandular-hairy. Calyx glandular-hairy; segments ¾–1 lin. long, oblong-lanceolate, obtuse, unequal. Corolla including spur 2 lin. long, glandular hairy; upper lip bifid; lobes short, acute; lower lip 3-lobed, 1½ lin. broad; lobes rounded. Capsule 1¼ lin. long, 1½ lin. in diam., depressed-globose, slightly emarginate, sparingly glandular-hairy.—Engl. Pfl. Ost-Afr. C. 356. *Linaria veronicoides*, A. Rich. Tent. Fl. Abyss. ii. 114. *Anarrhinum veronicoides*, O. Kuntze in Jahrb. Bot. Gart. Berlin, iv. 269. *Simbuleta veronicoides*, O. Kuntze, Rev. Gen. Pl. ii. 465.

Nile Land. Abyssinia: Begemeder? *Schimper*, 1119! 1180! Adowa, *Quartin-Dillon.*

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, *Volkens*, 576! Portuguese East Africa: Quilimane, *Kirk!* British Central Africa: Nyasaland; Mandala, *Scott-Elliot*, 8472!

Also in Madagascar.

3. **D. petiolaris,** *Benth. in DC. Prodr.* x. 265. A slender minutely puberulous, much-branched, prostrate or decumbent apparently annual herb. Leaves up to 1 in. long by 7 lin. broad, orbicular-elliptic, elliptic or obovate, rounded at the apex, more or less cuneate at the base, usually entire, sometimes obscurely (rarely coarsely) dentate; petiole ⅙–1 in. long. Peduncles 1–2½ in. long, filiform. Calyx minutely glandular-hairy; segments ¾–1 lin. long, unequal, ovate-lanceolate or oblong, subacute. Corolla with spur 6 lin. long; spur 2¼ lin. long, straight; upper lip short, 2-lobed: lobes subdeltoid; lower lip 3-lobed; lobes broad, rounded. Capsule 1¼ lin. long, 1½ lin. in diam., depressed-

globose, emarginate.—Engl. in Engl. Jahrb. x. 252; S. Moore in Journ. Bot. 1900, 467; Hiern in Dyer, Fl. Cap. iv. ii. 201. *D. viridis*, Marloth ex Engl. in Engl. Jahrb. x. 253 in note. *Anarrhinum Pechuelii*, O. Kuntze in Jahrb. Bot. Gart. Berlin, iv. 269. *Linaria Pechuelii*, O. Kuntze, l.c. *Simbuleta Pechuelii*, O. Kuntze, Rev. Gen. Pl. ii. 465.

Lower Guinea. German South-west Africa: Hereroland; Okahandya, 3900 ft., *Marloth*, 1344, and without precise locality, *Pechuel-Loesche*. Upingtonia, *Schinz*, 41! Dammaraland; bed of the Otyizeva River, *Schinz*; 41! and without precise locality, *Chapman & Baines!*

Mozamb. Dist. Rhodesia: Buluwayo, *Rand*, 372!

Also in South Africa.

4. **D. sessilifolia,** *Diels in Engl. Jahrb.* xxiii. 473. An erect branched sparingly glandular-pubescent or subglabrous herb, $2\frac{1}{2}$–6 in. high; stem and branches quadrangular. Leaves $2\frac{1}{2}$–6 lin. long, 1–3 lin. broad, subsessile, ovate to ovate-lanceolate, acute or obtuse, cuneate at the base, remotely denticulate. Peduncles 8–14 lin. long, filiform. Calyx-segments $\frac{1}{2}$–1 lin. long, oblong-lanceolate, obtuse. Corolla including spur $4\frac{1}{2}$ lin. long, yellow with purple streaks at the base and on the spur; spur $2\frac{1}{2}$ lin. long; upper lip rather deeply bifid; lobes acute; lower lip 3-lobed; lobes rounded. Capsule globose, 1–$1\frac{1}{2}$ lin. in diam., slightly emarginate.—Hiern in Cat. Afr. Pl. Welw. i. 756.

Lower Guinea. Angola: Huilla; Humpata, *Welwitsch*, 5771! *Johnston!* by the River Cunene, *Johnston!*

8. **LINARIA**, Juss.; Benth. et Hook. f. Gen. Pl. ii. 932.

Calyx 5-partite; segments imbricate. Corolla-tube spurred at the base in front; upper lip erect, 2-lobed; lower lip spreading, 3-lobed, produced at the base into a palate, closing the throat of the corolla, or more rarely depressed, leaving the throat open. Stamens 4, didynamous, ascending, included; filaments filiform; anther-cells distinct, oblong, parallel. Style filiform; stigma small, usually emarginate. Ovules many in each cell. Capsule ovoid or globose, dehiscing by a 3-valved pore at the apex of each cell, or by 4–10 valve-like teeth, or by circumscissile or valve-like opercula. Seeds ovoid, wingless, angular or rugose, or discoid and surrounded by a membranous wing.—Herbs, more rarely undershrubs. Lower leaves usually opposite, the upper nearly always alternate, quite entire, dentate or lobed. Flowers axillary or in terminal racemes or spikes; pedicels ebracteolate. Corolla yellow, white, violet to blue, or variously coloured.

Species about 150, nearly all in the northern extratropical regions of the old world.

All the Tropical African species belong to the section *Elatinoides* defined as follows: Leaves pinnately nerved, hastate, dentate or quite entire. Flowers axillary, distant. Corolla with a prominent palate. Capsule dehiscing by circumscissile or valve-like opercula. Seeds ovate-truncate or round, wingless; testa foveolate or granulose-tuberculate. Plant commonly procumbent, annual or subshrubby.

Leaves broadly triangular, cordate or ovate.
  Peduncles 3–11 lin. long.
    Plant more or less hairy; peduncles 3–5 lin. long . 1. *L. Elatine.*
    Plant quite glabrous; peduncles 6–11 lin. long . 2. *L. somalensis.*
  Peduncles ¾–1 lin. long.
    Calyx 2 lin. long; leaves 4–4½ lin. long, 3–4 lin. broad . . . . . 3. *L. Bentii.*
    Calyx 3 lin. long; leaves 1–1¼ in. long, ¾–1 in. broad . . . . . 4. *L. nubica.*
Leaves linear, lanceolate or narrowly oblong.
  Corolla 3-5 lin. long.
    Peduncles about 1 in. long . . . . . 5. *L. hastata.*
    Peduncles up to ½ in. long . . . . . 6. *L. asparagoides.*
  Corolla 9–10 lin. long . . . . . 7. *L. sagittata.*

1. **L. Elatine,** *Mill. Gard. Dict. ed.* viii. *no.* 16 (*Elatina by error*). A slender softly hairy much-branched annual; branches up to 2 ft. long, prostrate or decumbent, wiry, terete. Leaves usually about ¾ in. long and ½ in. broad, ovate, truncate, cordate or hastate at the base, minutely mucronate, entire or few-toothed near the base; petiole 1–3 lin. long. Peduncles 3–5 lin. long, axillary, solitary, slender, subglabrous or villous. Calyx 2¼ lin. long; segments linear-lanceolate or ovate-lanceolate, acuminate, somewhat unequal. Corolla (including the spur) about ½ in. long, pale yellow, violet on the inside of the upper lip and near the base of the lower lip; spur 3½ lin. long, straight or curved. Filaments pilose; anthers ciliate. Capsule slightly shorter than the calyx, globose, minutely puberulous, dehiscing by 2 oblique opercula.—Benth. in DC. Prodr. x. 268; A. Rich. Tent. Fl. Abyss. ii. 113; Engl. Hochgebirgsfl. Trop. Afr. 376; Almagià in Ann. Istit. Bot. Roma, viii. 138.

Nile Land. Eritrea: near Acrur, *Schweinfurth & Riva,* 1054! and various localities, *Terracciano & Pappi.* Abyssinia: Shoa, *Quartin-Dillon & Petit,* 220! Mensach, *Schimper,* 40! Gunnokle, *Schimper,* 712! Hawash and Maki Rivers, *Wellby*!

Also in Europe, North Africa, Madeira, and the Canary Islands.

There is a marked difference in the degree of hairiness of the specimens cited.

2. **L. somalensis,** *Vatke in Linnæa,* xliii. 305. A very slender diffusely-branched glabrous procumbent perennial. Leaves 3–4½ lin. long, 2–2¾ lin. broad, very thin, ovate, entire, acute; petiole 1–2 lin. long. Peduncles 6–11 lin. long, axillary, solitary, capillary. Calyx 2 lin. long; segments subulate-lanceolate, prominently 1-nerved, slightly keeled, unequal, transparent along the margins. Corolla (including the spur) 4½ lin. long, sparingly pubescent outside; palate glabrous; spur 1½ lin. long, nearly straight. Filaments sparingly pilose. Capsule shorter than the calyx, ovoid, glabrous, dehiscing by valve-like opercula.

Nile Land. Somaliland: Ahl Mountains, near Maid, 4900 ft.. *Hildebrandt.* 1409!

3. **L. Bentii,** *Skan.* An erect densely glandular-pubescent under-

shrub, about 1 ft. high, freely branched from the base; branches $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam. at the base, terete. Leaves 4–4$\frac{1}{2}$ lin. long, 3–4 lin. broad, rather crowded, somewhat fleshy, subopposite below, alternate above, cordate, obscurely triangular or ovate, usually quite entire, sometimes slightly dentate near the base, obtuse or minutely mucronate; petiole 1–1$\frac{1}{2}$ lin. long. Peduncles $\frac{3}{4}$–1 lin. long, axillary, solitary. Calyx 2 lin. long; segments subulate-lanceolate, slightly unequal. Corolla (including the spur) about 5 lin. long, sparingly pubescent; spur 2$\frac{1}{4}$ lin. long, somewhat curved. Filaments of the longer stamens sparingly hairy, of the shorter glabrous. Style 1 lin. long, pubescent. Capsule 1$\frac{1}{2}$ lin. long, globose-ovoid, minutely pubescent, shining, dehiscing by valve-like opercula. Seeds minutely tuberculate.

Nile Land. Nubia: about 21° North lat., sea-coast to between 3000 and 4000 ft., *Bent!*

4. **L. nubica,** *Skan.* A glandular-pubescent scandent or subscandent sparingly branched annual. Leaves opposite on the stem, alternate on the branches, 1–1$\frac{1}{4}$ in. long, $\frac{3}{4}$–1 in. broad, sometimes much smaller, broadly cordate or obscurely triangular to ovate, quite entire or with a few obscure teeth, broad at the apex and minutely mucronate or acute; petiole of the lower leaves 9–12 lin. long. Peduncles 1–1$\frac{1}{2}$ lin. long, axillary, solitary. Calyx 3 lin. long; segments subulate-linear, acute, slightly unequal. Corolla (including the spur) 4$\frac{3}{4}$ lin. long, hairy; spur 2 lin. long, straight. Filaments of the longer stamens sparingly hairy, of the shorter glabrous. Style 1 lin. long, stout, somewhat hairy. Capsule 1$\frac{1}{2}$ lin. long, ovoid, pubescent, dehiscing by valve-like opercula. Seeds tuberculate.

Nile Land. Nubia: about 21° North lat., sea-coast to between 3000 and 4000 ft., *Bent!*

5. **L. hastata,** *R. Br. in Salt, Abyss. Append.* 64, *ex Benth. in DC. Prodr.* x. 269. An extremely slender diffusely branched erect or ascending annual 9–12 in. high, sometimes pilose at the base, glabrous on the branches, leaves and peduncles. Leaves 5–12 lin. long, $\frac{1}{4}$–3 lin. broad, linear to lanceolate, acute, hastate or rarely rounded or cuneate at the base, opposite below, alternate above, shortly petiolate. Peduncles axillary, filiform, 9–15 (usually 13) lin. long. Calyx 1$\frac{1}{4}$ lin. long, glabrous or minutely glandular-hairy; segments lanceolate, acuminate, slightly keeled, more or less scarious on the margins. Corolla (including the spur) 3 lin. long, apparently yellow, minutely hairy; spur 1$\frac{1}{4}$ lin. long. Stamens coherent through the intertwining of the woolly hairs on the filaments and anthers. Capsule 1$\frac{1}{4}$–1$\frac{3}{4}$ lin. long, ovoid, glabrous, often straw-coloured, dehiscing by valve-like opercula.—A. Rich. Tent. Fl. Abyss. ii. 113; Schweinf. Beitr. Fl. Aethiop. 100; Almagià in Ann. Istit. Bot. Roma, viii. 137. *L. capillipes,* Hochst. ex Benth. in DC. Prodr. x. 269.

Nile Land. Red Sea: Hakeko, *Lord!* Eritrea: Togodele; Dalai, *Ehrenberg!* Modat; near Ailet, *Schimper,* 1042! Mount Maraita near Saati, *Schwein-*

furth & Riva, 551 ! and various localities, *Terracciano & Pappi*. Abyssinia: without precise locality, *Salt !* Somaliland: Wagga Mountain, *Mrs. Lort-Phillips !*

Also in Socotra.

6. **L. asparagoides,** *Schweinf. Beitr. Fl. Aethiop.* 99 *and* 241. A glabrous undershrub. Stem erect, very much branched from the base; branches very long and slender. Leaves 1½–2 in. long, ¼–1 lin. broad, narrowly linear, flaccid, sessile, gradually attenuated towards the base. Peduncles up to ½ in. long, capillary. Calyx 1 lin. long; segments lanceolate-subulate, very acute. Corolla including spur about ½ in. long; lower lip twice as long as the upper; spur 1½ lin. long. Seeds tuberculate.

Nile Land. Abyssinia: Gageros, 4000 ft., *Schimper*; and without precise locality, *Schimper*, 442 !

7. **L. sagittata,** *Hook. f. Bot. Mag. t.* 6060. A slender diffusely branched subscandent perennial, glabrous on the branches, leaves and peduncles; stem short, thick; branches terete, woody at the base, sometimes almost leafless. Leaves from a few lines to 2 in. long by ⅓–3½ lin. broad, narrowly linear to linear-oblong or lanceolate, sagittate or hastate or sometimes cuneate or rounded at the base, entire, acute, rarely obtuse; petiole 1–6 lin. long, sometimes tendril-like. Flowers distant, axillary; peduncles 5–8 lin. long. Calyx 2 lin. long, glabrous or glandular-pubescent; segments lanceolate, acuminate, more or less scarious on the margins. Corolla (including the spur) 9–10 lin. long, yellow, pilose outside; palate clothed with long citron-yellow hairs; spur about ½ in. long. Filaments densely pilose. Capsule shorter than the calyx, globose, glabrous. Seeds tuberculate.—*L. heterophylla*, Steud. Nom. ed. i. 482; Spreng. Syst. ii. 790; Benth. in DC. Prodr. x. 270, not of Desfont. *L. patula*, Baker in Kew Bulletin, 1895, 222. *Antirrhinum heterophyllum*, Schousboe, Beobacht. Gewächsr. Marokko, 181, t. 3. *A. sagittatum*, Poir. Encycl. Suppl. iv. 19. *L. gracilis*, R. Br. in Salt, Abyss. Append. 64, and ex Benth. in DC. Prodr. x. 269; Almagià in Ann. Istit. Bot. Roma, viii. 137. *L. gracilis*, var. *propinqua*, Benth. l.c. v. 270. *L. propinqua*, R. Br. l.c. 64.

Nile Land. Nubia: coast region, *Bent !* Otao, *Johnston*, 10 ! Mount Uaratab, *Schweinfurth*, 235 ! Wadi O-Mareg, *Schweinfurth*, 438 ! Eritrea: Habab, *Hildebrandt*, 447 ! Addi Conzi and Haichello Rokob, near Acrur, *Schweinfurth & Riva*, 1169 ! 1106 ! Mount Alam Kale. *Schweinfurth & Riva*, 1655 ! various localities, *Terracciano & Pappi*. Abyssinia: without precise locality, *Salt !* Somaliland: near Wadaba, *Miss Edith Cole; Mrs. Lort-Phillips !*

Also in North Africa, Arabia, and the Canary Islands.

Many of the specimens cited above have been named *L. macilenta*, Decne., a species apparently confined to the Sinai Peninsula. This has a different habit, much shorter peduncles, minute flowers, and much smaller capsules. *L. sagittata* is very polymorphic in habit, shape and size of the leaves, and in the length of the peduncles.

Imperfectly known species.

8. **L. indecora,** *Franch. Sert. Somal.* 55. Dwarf, glabrous. Branches slender. Leaves narrowly linear. Flowers minute, glabrous; peduncles filiform, rather elongated. Corolla (including the spur) scarcely 2 lin. long; spur rather thick, straight, acute.

Nile Land. Somaliland: without precise locality, *Révoil.*

This is probably *L. hastata,* R. Br.

9. **L. stenantha,** *Franch. Sert. Somal.* 55. A low very much-branched glabrous undershrub; branches slender, densely leafy. Leaves oblong, obtuse, attenuated at the base, quite entire, petiolate. Peduncles filiform, long. Corolla (including the spur) 5 lin. long, narrow, pubescent; spur elongated, straight, subulate.

Nile Land. Somaliland: without precise locality, *Révoil.*

9. **ANARRHINUM,** Desf.; Benth. et Hook. f. Gen. Pl. ii. 933.

Calyx 5-partite; segments imbricate. Corolla-tube with or without a short spur at the base (spurless in the Tropical African species); throat equal, open; upper lip 2-lobed; lobes at first erect, then reflexed; lower lip 3-lobed, spreading. Stamens 4, didynamous, ascending, included; filaments filiform; anthers reniform, with confluent cells. Style filiform; stigma small. Ovules numerous. Capsule small, ovoid or globose, often retuse, hard, dehiscing by 2 irregular apical sometimes confluent pores. Seeds ovoid, wingless, tuberculate or somewhat muricate.—Biennial or perennial usually erect herbs. Leaves often in a rosette at the base, and alternate, narrow, dissected or entire on the stem. Flowers small in spike-like often long virgate interrupted racemes.—*Simbuleta,* Forsk. Fl. Ægypt.-Arab. 115.

Species 12, natives of the Mediterranean region and the Orient, one extending into Tropical Africa.

1. **A. orientale,** *Benth. in DC. Prodr.* x. 289. A glabrous or puberulous branched erect undershrub $1\frac{1}{2}$–3 ft. high. Leaves $\frac{1}{2}$–$1\frac{1}{2}$ in. long; radical leaves cuneate-oblong, incised-dentate, on long petioles; cauline leaves cuneate and incised-dentate, or divided nearly to the base into 3 linear or linear-lanceolate segments, or linear and entire, acute, attenuated at the base into a short petiole. Flowers in a branched rather dense spike-like raceme 6–12 in. long; bracts linear-lanceolate, usually longer than the calyx; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Calyx about 1 lin. long; segments 5 or 6, broad at the base, subulate above, hyaline at the margins and tips. Corolla $2\frac{1}{2}$ lin. long, not spurred. Capsule $1\frac{1}{4}$ lin. long, ovoid, glabrous. Seeds tuberculate.—A. Rich. Tent. Fl. Abyss. ii. 115; Jaub. & Spach, Illust. Pl. Orient. v. 50, 54, t. 450; Martelli, Fl. Bogos. 63. *A. abyssinicum,* Jaub. & Spach, l.c. v. 50, 52, tt. 447–449. *A. arabicum,* Jaub. & Spach, l.c. v. 50, 51, t. 446. *A. arabicum,* var. *abyssinicum,* Engl. Hochgebirgsfl. Trop. Afr. 377; Almagià in Ann. Istit. Bot. Roma, viii. 138. *A. fruticosum,* Schimp.

and of others ex Benth. in DC. Prodr. x. 289, not of Desfont. *Simbuleta arabica*, Forsk. ex Poir. Encycl. vii. 194. *S. arabica*, var. *abyssinica*, Vatke in Oest. Bot. Zeitschr. 1875, 9. *S. orientalis*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 60.

Nile Land. Eritrea: Keren, *Steudner*, 793! Keren to Massowa, *Beccari*; Hababab Bora, 7000 ft., *Hildebrandt*, 657b; Saganeiti; northern slope below Addi. Abboour, *Schweinfurth & Riva*, 1791! and various localities, *Terracciano & Pappi*, Abyssinia: Shireh, *Quartin-Dillon & Petit!* Wojerat, *Quartin-Dillon & Petit*, 214! Tigre; Mount Sholoda, *Schimper*, 192! Semayata Mountain, *Schimper*, 483! and without precise locality, *Schimper*, 94!

Also in Arabia, Syria, and Mesopotamia.

10. **SCHWEINFURTHIA**, A. Braun; Benth. et Hook. f. Gen. Pl. ii. 933.

Calyx 5-partite; segments imbricate, the posticous larger than the others. Corolla-tube subsaccate at the base; upper lip 2-lobed, erect, at length reflexed at the margin; lower lip 3-lobed, reflexed-spreading; palate rather prominent, closing the throat. Stamens 4, didynamous, ascending; filaments glandular-pilose at the base; anther-cells diverging, at length divaricate, confluent at the apex; rudiment of the fifth stamen small. Style filiform; stigma minute. Ovules numerous in each cell. Capsule subglobose; pericarp fragile; anticous cell many-seeded, dehiscing irregularly; posticous cell much smaller or very small and compressed, 3–4-seeded or empty, indehiscent or at length bursting irregularly. Seeds obconic-truncate, with 6 longitudinal subwinged ridges.—Annual or perennial diffuse glabrous and glaucous herbs. Leaves usually alternate, quite entire. Flowers axillary, pedunculate, small.

Species 4, in Socotra and the Comoro Islands, Arabia, Afghanistan, and Western India.

Plant 6–9 in. high; leaves elliptic-spathulate to linear-oblong; peduncles 3–5 lin. long	1. *S. pterosperma.*
Plant up to 2 ft. high; leaves usually narrowly linear; peduncles 5–8 lin. long	2. *S. aptera.*

1. **S. pterosperma,** *Al. Braun in Sitzb. Ges. Naturf. Fr.* xx. (1866) 24, *& in Monatsber. Akad. Wiss. Berlin*, 1866, 872, *with plate.* A much-branched erect annual 6–9 in. high. Leaves up to 1 in. long and 5 lin. broad, the uppermost much smaller, elliptic-spathulate to linear-oblong, obtuse, narrowed at the base; petiole from a few lines to $\frac{3}{4}$ in. long. Peduncles solitary, 3–5 lin. long, filiform. Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; segments ovate-lanceolate, obtuse or subacute. Corolla 3–4 lin. long, white, rose-tinted at the throat. Capsule 3–$3\frac{1}{2}$ lin. in diam.; posticous cell 1–3-seeded or quite empty.—Terracciano in Ann. Istit. Bot. Roma, v. 103. *Antirrhinum ? pterospermum*, A. Rich. Tent. Fl. Abyss. ii. 115.

Nile Land. Nubia: near Fula, *Schweinfurth*, 173! Mount Caratab near Suakin, and at Wadi Tereb Aria, between Suakin and Berber, *Schweinfurth.* Red Sea, between 11° and 12° North lat., *Lord!* coast region, *Bent!* Eritrea: Hamfila

Bay, Midir Island, *Terracciano*, 220. Massowa to Ras Gerar, *Beccari!* Abyssinia: Shoho, *Quartin-Dillon & Petit*. Somaliland: without precise locality, *Miss Edith Cole!*

Also in Arabia.

2. **S. aptera,** *Vatke in Oest. Bot. Zeitschr.* 1875, 96, *under Antirrhinum apterum, Vatke.* A diffusely branched glabrous subshrubby annual $\frac{1}{2}$–2 ft. high. Leaves narrowly linear or the lower sometimes spathulate linear, $\frac{1}{2}$–2 in. long, obtuse or acute, narrowed at the base, quite entire or very rarely the lower bidentate. Flowers solitary in the axils of the upper leaves; peduncles 5–8 lin. long, filiform, spreading. Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; segments ovate-lanceolate, acute. Corolla about $3\frac{1}{4}$ lin. long, white tinted with rose. Capsule as in *S. pterosperma*. —*Anarrhinum pedicellatum*, T. And. in Journ. Linn. Soc. v., Suppl. 26.

Nile Land. Somaliland: Ahl Mountains near Lasgori, 4900 ft., *Hildebrandt*, 861!

Also in South Arabia, Socotra, the Comoro Islands, and Bombay.

11. **ANTIRRHINUM**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 934.

Calyx 5-partite; segments imbricate. Corolla-tube saccate or gibbous at the base, not spurred; upper lip erect, shortly 2-lobed; lower lip spreading, 3-lobed, produced at the base into a prominent palate which often closes the throat. Stamens 4, didynamous, ascending, included; filaments filiform or dilated at the apex; anther-cells distinct, oblong, parallel. Style filiform; stigma small. Ovules numerous in each cell. Capsule ovoid or globose, sometimes oblique, with the posticous cell dehiscing by one pore and the anticous cell by two many-toothed pores, sometimes equal with one pore to each cell. Seeds oblong, truncate, rugose or rather smooth.—Annual or perennial herbs, more rarely undershrubs, sometimes climbing. Lower leaves alternate, rarely opposite, the upper alternate, all quite entire or rarely lobed. Flowers solitary, axillary or in terminal racemes; pedicels ebracteate. Corolla usually showy, rose-coloured, purple, pale-yellow or white.

Species about 35, chiefly in the temperate regions of the northern hemisphere, especially in North America.

1. **A. Orontium,** *Linn. Sp. Pl.* 617. An erect branched biennial, a few inches to 2 ft. high; stem and branches more or less glandular-hairy, especially in the upper parts, or glabrescent. Leaves 1–2 in. long, 1–4 lin. (usually about 2 lin.) broad, lanceolate to linear, acute, subacute or obtuse, glabrous or sometimes remotely ciliate, entire. Inflorescence a rigid distant-flowered raceme; bracts similar to the upper leaves but smaller; pedicels very short, usually hispidly glandular-hairy. Calyx sparingly hispidly hairy; segments $4\frac{1}{2}$–7 lin. long or sometimes longer, linear, unequal, acute. Corolla 4-9 lin. long, rose-coloured with purple veins. Capsule 4–6 lin. long, obliquely ovoid, hispidly hairy.—Benth. in DC. Prodr, x. 290; Hook. f. Fl. Brit. Ind. iv. 253; Martelli, Fl. Bogos. 63; Engl. Bot. ed. 3, vi. 131, t. 954;

Hiern in Dyer, Fl. Cap. iv. ii. 205. *A. Orontium*, var. *abyssinicum*. Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 114; Engl. Hochgebirgsfl. Trop. Afr. 377; Almagià in Ann. Istit. Bot. Roma, viii. 138.

Nile Land. Nubia: coast region, *Bent!* Eritrea: Mount Kube, *Schweinfurth & Riva*, 1539! Mount Deban, *Beccari*, 266! and various localities, *Terracciano & Pappi*. Abyssinia: near Adowa, *Schimper*, 105! Debra Eski, *Schimper*, 89; Bellaka, *Schimper*, 416. Hawash and Maki Rivers, *Wellby!* and without precise locality, *Schimper*, 893! 1869!

Widely spread in Europe, Asia, North Africa, the Canary Islands, Socotra, Mauritius, and South Africa.

12. **HALLERIA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 936.

Calyx cup-shaped-campanulate; lobes 3–5, broad and short. Corolla-tube curved or straight, inflated above; limb short, spreading, sometimes oblique, with the upper outside lip shortly 2-lobed and the lower lip longer, concave and shortly 3-lobed, or the lips nearly equal. Stamens 4, didynamous, scarcely declinate, affixed to the middle of the corolla-tube, usually exserted; filaments filiform; anther-cells diverging, at length divaricate, scarcely confluent; rudiment of the fifth stamen 0. Style filiform; stigma minute. Ovules numerous in each cell. Fruit a berry. Seeds rather large, compressed, surrounded by a rather thick narrow wing.—Glabrous shrubs. Leaves opposite, often ovate, smooth, shining, quite entire or dentate. Pedicels often fascicled on a very short axillary peduncle, rarely solitary, with two bracteoles below the middle. Corolla red.

Species 5, extending to South Africa and Madagascar.

Leaves ovate, usually $2\frac{1}{2}$–3 in. long; corolla-tube curved	1. *H. lucida.*
Leaves elliptic, 1–$1\frac{3}{4}$ in. long; corolla-tube straight .	2. *H. elliptica.*

1, **H. lucida,** *Linn. Sp. Pl.* 625, *excl. var.* β. A shrub or sometimes a tree, reaching a height of 30–50 ft. Leaves 1–$3\frac{1}{2}$ in. long, $\frac{1}{2}$–2 in. broad, usually broadly ovate, coriaceous, acuminate or caudate-acuminate, cuneate or rounded at the base, serrate-crenate or serrulate; petiole 2–4 lin. long. Flowers 2–8 or more together, rarely solitary, in the axils of the leaves or sometimes on the leafless parts of the stems and branches; pedicels 5–6 lin. long. Calyx 4-5 lin. in diam., shortly 3–5-lobed. Corolla 9–15 lin. long, brown-red, orange or purple; tube curved, slightly gibbous at the base in front, minutely pubescent outside; limb unequally 4-lobed; posticous lobe entire, emarginate or bifid. Stamens and style exserted. Berry 6–8 lin. long, ellipsoid or globose, dark purple.—Benth. in Hook. Comp. Bot. Mag. ii. 54, and in DC. Prodr. x. 301; A. Rich. Tent. Fl. Abyss. ii. 116; Bot. Mag. t. 1744; Engl. in Engl. Jahrb. xxx. 401; Hiern in Dyer, Fl. Cap. iv. ii. 207. *H. abyssinica*, Jaub. & Spach, Illustr. Pl. Orient. v. 65, 66, tt. 459, 460; Engl. Hochgebirgsfl. Trop. Afr. 377.

Nile Land. Abyssinia: Shireh, *Quartin-Dillon*. Samen; around Mount Aber, *Schimper*, 858! and without precise locality, *Roth*, 473!

Lower Guinea. Angola: by the River Cunene, *Johnston!*

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 6560 ft., *Volkens*, 1281! Kinga (Livingstone) Mountains, 8500 ft., *Goetze*, 946. British Central Africa: Nyasaland; Zomba Plateau, 5000 ft., *Whyte!*

Also in South Africa.

2. **H. elliptica,** *Thunb. in Nov. Act. Upsal.* vi. 39. An erect shrub 4–6 ft. high; branches subquadrangular. Leaves 1–1¾ in. long, ¼–1 in. broad, elliptic or elliptic-ovate, coriaceous, acute, minutely and remotely denticulate or sometimes distinctly serrate; petiole 1–2 lin. long. Flowers solitary or 2–8 together; pedicels 5 lin. long. Calyx 3 lin. in diam., 2 lin. long; lobes subequal, broadly rounded, minutely mucronate. Corolla ¾–1 in. long; tube straight, slightly and equally dilated at the base, much dilated above, minutely glandular-pubescent, very shortly 4-lobed; lobes subequal. Stamens and style included or at length exserted. Berry 4–5 lin. long, dark purple, ellipsoid or globose. —Benth. in Hook. Comp. Bot. Mag. ii. 54, and in DC. Prodr. x. 302; Engl. Pfl. Ost-Afr. C. 356; Hiern in Dyer, Fl. Cap. iv. ii. 209. *H. lucida*, var. β, Linn. Sp. Pl. 625.

Mozamb. Dist. Portuguese East Africa: Makua Country; Namuli Hills, *Last!* British Central Africa: Nyasaland; Mount Mlanji, *Whyte!* Fuchila Plateau, 6000 ft., *Purves*, 79!

Also in South Africa.

13. **SCROPHULARIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 937.

Calyx deeply 5-fid or 5-partite; segments usually obtuse, sometimes orbicular and scarious on the margins, rarely rather acute. Corolla-tube ventricose, globose or oblong; lobes 5, short, flat, 4 (including the 2 posticous, which are usually larger) erect; anticous lobe spreading. Perfect stamens 4, didynamous, affixed to the corolla-tube, declinate, included or exserted, filaments filiform or rather thick; staminode posticous, scale-like, affixed to the apex of the corolla-tube, or wanting; anther-cells confluent, transverse. Style filiform; stigma minute or more rarely capitate. Ovules numerous in each cell. Capsule ovoid or subglobose, usually acute, septicidal; valves entire or bifid. Seeds ovoid, rugose, not winged.—Glabrous or hirsute, often fœtid herbs or under-shrubs. Leaves opposite or the upper alternate, entire, incised or dissected, often with pellucid dots. Inflorescence a terminal simple or branched thyrsus of lax cymes. Flowers rather small, greenish-purple, purple or yellow.

Species about 120, in the extratropical regions of the northern hemisphere.

1. **S. arguta,** *Soland. in Ait. Hort. Kew. ed.* 1, ii. 342. An erect more or less glandular-pubescent annual, 6 in. to 2 ft. high; stem simple or with a few straight ascending branches. Leaves up to 2¾ in. long and 2 in. broad, broadly ovate, acute, subcordate, truncate or cuneate at the base, irregularly dentate or bidentate; petiole ½–1 in.

long. Cymes 2–5-flowered or sometimes reduced to one flower, shortly pedunculate, forming a rigid leafy or sometimes almost leafless thyrsus; pedicels 1–3½ lin. long; bracteoles setaceous, very small. Calyx 1¼ lin. long; segments ovate or ovate-lanceolate, obtuse or subacute. Corolla urceolate, rather longer than the calyx. Stamens included; staminode orbicular-obcordate. Capsule 2¼–3½ lin. long, ovoid, beaked, glabrous. —Benth. in DC. Prodr. x. 305; Vatke in Linnæa, xliii. 306; Almagià in Ann. Istit. Bot. Roma, viii. 139; Webb & Berth. Iles Canaries, Phyt. iii. iii., 131, t. 177. *S. rostrata*, Hochst. ex Boiss. Fl. Orient. iv. 395.

Nile Land. Nubia: Hor Tamanib, *Lord!* Coast region, *Bent!* Eritrea: various localities, *Terracciano & Pappi.* Abyssinia: Tacazze Valley, *Schimper*, 1428! Somaliland: Serrut Mountains, 4900ft., near Maid, *Hildebrandt*, 1407! and without precise locality, *Mrs. Lort Phillips!*

Also in Europe, North Africa, Canary Islands, Arabia, and Socotra.

14. **POLYCARENA**, Benth.; Benth. et Hook. f. Gen. Pl. ii. 944.

Calyx membranous, 2-lipped, bipartite in the fruiting stage. Corolla persistent; tube slender, longer or shorter than the calyx, dilated at the throat; lobes 5, spreading, entire, subequal, the two posticous outside. Stamens 4, didynamous, affixed to the corolla-tube, shortly exserted; anthers 1-celled by confluence. Style filiform, clavate at the apex; stigma obtuse. Ovules numerous in each cell. Capsule membranous, septicidal; valves bifid. Seeds numerous; testa loose.—Dwarf viscous usually much-branched annual herbs. Leaves opposite below, alternate above, entire or dentate. Flowers small, in terminal racemes or spikes, which are at first capitate, at length elongated; bracts leaf-like, solitary, adnate to the pedicel and calyx.

Species 21, all except the following endemic in South Africa.

1. **P. discolor,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 191. A slender erect or suberect sparingly branched glandular-pubescent annual, 1¾–5 in. high. Leaves sessile, 2–6 lin. long, ¼–¾ lin. broad, linear or narrowly lanceolate, obtuse, usually entire, sometimes remotely denticulate. Inflorescence 3–4 lin. long and broad, elongating in the fruiting stage; bracts lanceolate or narrowly oblong, 1½–2 lin. long; pedicels very short. Calyx 1½ lin. long; segments unequal, ¾–1 lin. long, linear, obtuse, concave inside. Corolla 2¾ lin. long, glabrous; tube 1¼–1½ lin. long; limb 2-lipped; upper lip shorter than the lower, whitish with 2 deep-orange-yellow blotches; lower lip at first blue, afterwards rose-coloured. Stamens and style exserted. Capsule 1½ lin. long, oblong-ellipsoid, glabrous.—Hiern in Dyer, Fl. Cap. iv. ii. 327.

Lower Guinea. German South-west Africa: Uridum, on the west border of the Kalahari, *Schinz*, 32! and without precise locality, *Chapman & Baines!*

Also in Bechuanaland.

15. **JAMESBRITTENIA**, O. Kuntze, Rev. Gen. Pl. ii. 461.

Calyx 5-partite; segments narrow, scarcely imbricate. Corolla-tube slender, equal, not dilated at the throat; limb small, subpatent; lobes 5, obtuse, somewhat unequal, the two posticous outside and somewhat smaller. Stamens 4, didynamous, included; filaments filiform; anthers 1-celled by confluence. Style short, filiform, shortly 2-lobed. Capsule ovoid-oblong, septicidal; valves shortly bifid. Seeds numerous, slightly rugose.—Dwarf diffuse very much branched viscid-pubescent herbs. Lower leaves opposite, the upper alternate, incised-pinnatifid or dissected; segments incised or dentate. Flowers small, axillary, or the upper flowers in terminal racemes.—*Sutera*, Roth, Nov. Pl. Spec. 291, not of his Bot. Bemerk. 172.

Species 1.

1. **J. dissecta,** *O. Kuntze, Rev. Gen. Pl.* iii. 461. Branches 4–12 in. long, decumbent or ascending, terete, slender. Leaves $\frac{1}{4}$–1 in. long, 2–5 lin. broad, ovate or oblong, incised-dentate, pinnatifid or dissected, narrowed at the base, petiolate. Pedicels 1–2 lin. long, slender. Calyx $1\frac{1}{4}$ lin. long; segments linear-oblanceolate, subacute. Corolla 2 lin. long, nearly white; lobes $\frac{1}{2}$ lin. long, $\frac{1}{3}$ lin. broad. Capsule as long as or slightly longer than the calyx.—*Sutera glandulosa*, Roth, Nov. Pl. Spec. 291; Benth. in DC. Prodr. x. 362; Hook. f. Fl. Brit. Ind. iv. 258; Schweinf. Beitr. Fl. Aethiop. 101. *S. dissecta*, Walp. Rep. iii. 271. *Capraria dissecta*, Del. Fl. d'Égypte, 95, t. 32, fig. 3.

Nile Land. Nubia: near Khartoum, *Kotschy*, 330! between Korosko and Derr, *Bromfield!* White Nile; El-Ehs, *Schweinfurth*, 976! near Wady Halfa and near Dabbe. *Ehrenberg.*

Also in Egypt, Arabia, and India.

16. **MANULEA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 946.

Calyx deeply 5-fid or 5-partite; segments narrow, scarcely imbricate. Corolla deciduous; tube elongated, slender, suberect at the apex; throat usually not dilated; limb spreading; lobes 5, entire or emarginately 2-fid, equal, or the 2 posticous (exterior) lobes more approximated or more connate. Stamens 4, didynamous; filaments filiform, short; anthers 1-celled by confluence; upper pair reniform, perfect or sterile, included or slightly exserted; lower pair oblong, perfect, included. Style filiform, subclavate at the apex; stigma obtuse. Capsule with septicidal dehiscence; valves bifid at the apex. Seeds numerous, rugose.—Glabrous or pubescent herbs, very rarely undershrubs. Leaves often in rosettes or crowded at the base of the stem; cauline leaves usually few, opposite or the upper alternate. Flowers usually in fascicles forming elongated irregular thyrsoid racemes, sometimes in simple racemes. Corolla usually orange-coloured.—*Nemia*, Bergius, Desc. Pl. Cap. 160.

A genus of 37 species, all but the following confined to South Africa.

1. **M. angolensis,** *Diels in Engl. Jahrb.* xxiii. 478. An erect annual or biennial herb $1\frac{1}{2}$–$2\frac{1}{2}$ ft. high; root thick, sometimes more or less turnip-shaped; stem stout, simple, sparingly and minutely glandular-puberulous, terete, scantily leafy. Radical leaves 1–$1\frac{1}{2}$ in. long, 3–4 lin. broad, oblong-lanceolate or lanceolate, obtuse, much attenuated at the base, obscurely and remotely crenate-serrate, sparingly and minutely glandular-puberulous, forming a loose rosette; cauline leaves distant, alternate, similar to the radical leaves. Thyrsus few-branched, 1–$1\frac{1}{2}$ ft. long; cymes distant, shortly stalked; flowers crowded, sessile. Calyx $\frac{3}{4}$–1 lin. long, dusky orange-coloured; segments spathulate-linear, much thickened at the apex, obtuse, ciliate. Corolla $2\frac{3}{4}$–3 lin. long, orange-coloured, nearly glabrous, subringent; tube somewhat inflated on the posticous side at the apex; limb $1\frac{3}{4}$ lin. in diameter; lobes oblong, scarcely $\frac{3}{4}$ lin. long, less than $\frac{1}{2}$ lin. broad, subequal. Stamens included; lower anthers perfect, oblong, the upper reniform, imperfect, very much smaller than the lower. Style filiform, $2\frac{1}{2}$ lin. long. Capsule 1 lin. long, broadly ovoid.—*Nemia angolensis*, Hiern in Cat. Afr. Pl. Welw. i. 757.

Lower Guinea. Angola: Huilla, *Welwitsch*, 5836! near Lopollo, *Welwitsch*, 5835!

17. **SUTERA,** Roth, Bot. Bemerk. 172, not of Nov. Pl. Sp. 291.

Calyx usually 5-partite, sometimes 5-lobed; segments or lobes linear, lanceolate or rarely ovate, imbricate, not membranous. Corolla deciduous, tubular; tube shorter or much longer than the calyx, usually slender, cylindric below or funnel-shaped, nearly straight or more or less curved towards the apex, gibbous on the upper side near the apex or more or less dilated at the throat or sometimes nearly entirely cylindric; limb spreading, 5-lobed, more or less regular or 2-lipped; lobes entire, emarginate or bifid, subequal, imbricate in bud, the 2 uppermost outside. Stamens 4, didynamous, affixed to the corolla-tube, more or less exserted or the upper or all of them included; filaments filiform; anthers all perfect, 1-celled by confluence, reniform. Style filiform, included or exserted, somewhat clavate above; stigma obtuse. Capsule septicidal; valves bifid. Seeds many, small, rugose.—Glabrous, pubescent, sometimes viscid herbs, undershrubs or small shrubs often drying blackish. Leaves mostly opposite, dentate, incised or dissected, rarely entire. Bracts usually similar to the leaves, free from the pedicels. Flowers axillary or in terminal racemes or in simple or compound cymes or spikes; pedicels ebracteolate or rarely bracteolate.—*Chænostoma,* Benth. in Hook. Comp. Bot. Mag. i. 374, and in Benth. et Hook. f. Gen. Pl. ii. 945. *Lyperia*, Benth. in Hook. Comp. Bot. Mag. i. 377, and in Benth. et Hook. f. Gen. Pl. ii. 945. *Camptoloma*, Benth. in DC. Prodr. x. 430, and in Benth. et Hook. f. Gen. Pl. ii. 960. *Urbania*, Vatke in Oest. Bot. Zeitschr. 1875, 10.

Species 123, most numerous in South Africa; 1 in the Canary Islands.

Corolla 2–5 lin. long.
Annual herbs.
Pedicels $1\frac{1}{2}$–$2\frac{1}{4}$ in. long; corolla-tube narrowly cylindric below . . . . . 1. *S. pedunculosa.*
Pedicels 6–10 lin. long; corolla-tube funnel-shaped 2. *S. hereroensis.*
Perennials, often with woody stems and branches.
Calyx $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, about as long as the corolla-tube; leaves narrowly lanceolate, pinnatifid or pinnatipartite . . . 3. *S. elegantissima.*
Calyx $1\frac{1}{4}$–2 lin. long, much shorter than the corolla-tube; leaves lanceolate to obovate and entire to pinnatifid, or ovate to suborbicular and bipinnatisect.
Leaves ovate or suborbicular, bipinnatisect . 4. *S. aurantiaca.*
Leaves lanceolate to obovate, entire, toothed or pinnatifid.
Corolla 5 lin. long; leaves entire or shortly toothed . . . . . 5. *S. canescens.*
Corolla up to 3 lin. long; leaves deeply toothed or pinnatifid.
Plant up to 1 ft. high; branches $\frac{1}{2}$ lin. thick; capsule $1\frac{1}{4}$–$1\frac{1}{2}$ in. long . 6. *S. micrantha.*
Plant up to $1\frac{1}{2}$ ft. high; branches up to $1\frac{1}{2}$ lin. thick; capsule $2\frac{1}{4}$ to $2\frac{3}{4}$ lin. long . . . . . 7. *S. blantyrensis.*

Corolla 6–14 lin. long.
Annual herbs, or, if perennial, with herbaceous stems and branches; leaves usually large, on long petioles.
Pedicels 1–5-flowered, bracteolate; calyx-segments more than 1 lin. broad.
Plant deeply covered with long soft hairs; leaves up to $1\frac{1}{4}$ in. in diam.; petioles up to 10 lin. long . . . . . 8. *S. corymbosa.*
Plant very sparingly and shortly hairy; leaves up to 2 in. in diam.; petioles up to 15 lin. long . . . . . 9. *S. Welwitschii.*
Pedicels always 1-flowered, ebracteolate except in *S. dubia;* calyx-segments less than 1 lin. broad.
Pedicels bracteolate, shorter than the calyx; plant $1\frac{1}{2}$ ft. high or more . . . . 10. *S. dubia.*
Pedicels ebracteolate, 2–6 times as long as the calyx; plant 6–12 in. high.
Lower leaves cordate; pedicels twice as long as the calyx . . . . . 11. *S. lyperiæflora.*
Lower leaves not cordate; pedicels 3–6 times as long as the calyx.
Plant very viscid; leaves acute, cuneate at the base; capsule 3–4 lin. long . . 12. *S. tomentosa.*
Plant not viscid; leaves obtuse, rounded or subtruncate at the base; capsule 2–$2\frac{1}{2}$ lin. long . . . . 13. *S. heucherifolia.*
Perennials with woody stems and branches; leaves small, sessile or shortly stalked.

Leaves close together, often overlapping, sessile, amplexicaul or at least broad at the base; flowers subsessile.
Corolla 6 lin. long . . . . . 14. *S. amplexicaulis.*
Corolla 8–12 lin. long . . . . . 15. *S. Maxii.*
Leaves less close together, not overlapping, stalked or at least narrowed at the base; flowers distinctly stalked.
Leaves lanceolate, ovate to suborbicular, up to 1¼ in. long and 7½ lin. broad.
Plant covered with grey somewhat matted soft hairs; leaves about as broad as long; flowers 5–7 lin. long . . . . . 16. *S. Gossweileri.*
Plant covered with short rather stiff often glandular hairs or the leaves almost glabrous; leaves distinctly longer than broad; flowers 8½–14 lin. long.
Inflorescence pyramidal; bracts large, similar to the leaves . . . . . 17. *S. Carvalhoi.*
Inflorescence subcorymbose; bracts small, linear . . . . . 18. *S. grandiflora.*
Leaves usually cuneate, ¾–6 lin. long, 1½–3 lin. broad.
Leaves much toothed; calyx 2½–3 lin. long; corolla white . . . . . 19. *S. burkeana.*
Leaves entire or few-toothed only at the apex; calyx 1¼–2 lin. long; corolla saffron, reddish-brown or purple-red.
Leaves ¾–2 lin. long, ½–⅔ lin. broad, entire; corolla-lobes ¾ lin. broad . . . 20. *S. atropurpurea.*
Leaves 2–6 lin. long, toothed at the apex; corolla-lobes 1½–2 lin. broad . . . 21. *S. huillana.*

1. **S. pedunculosa,** *O. Kuntze, Rev. Gen. Pl.* ii. 467. A decumbent diffuse much-branched glandular-pubescent annual herb; branches up to 18 in. long. Leaves up to 1 in. long and ½ in. broad, elliptic-ovate, usually acute, cuneate at the base, irregularly bidentate, incised-dentate or pinnatifid, subsessile or petiolate; petioles up to 8 lin. long. Flowers axillary; pedicels filiform, 1½–2¼ in. long. Calyx 1¼–1½ lin. long; segments linear-lanceolate, somewhat acute. Corolla yellow; tube 2–3 lin. long, narrow, cylindric and straight below, equally dilated at the throat; limb 4–5 lin. in diam.; lobes suborbicular, nearly equal. Stamens included, the longer pair as long as the corolla-tube. Capsule 2–2¼ lin. long, ovoid, emarginate, bisulcate, minutely glandular-pubescent.—Hiern in Dyer, Fl. Cap. iv. ii. 267. *Chænostoma pedunculosum*, Benth. in Hook. Comp. Bot. Mag. i. 377, and in DC. Prodr. x. 357; Marloth ex Engl. in Engl. Jahrb. x. 253.

Lower Guinea. German South-west Africa: Hereroland; Hykamkab, 1000 ft., *Marloth*, 1207. Otyimbingue, 2950 ft., *Marloth*, 1380.

Also in Little Namaqualand.

2. **S. hereroensis,** *Skan.* A sparsely pilose annual 4–6 in. high; stem slender, simple or sparingly branched; branches 2–4 in. long.

Leaves $\frac{1}{2}$–1 in. long, $\frac{1}{3}$–$\frac{2}{3}$ in. broad, thin, broadly ovate, usually acute, truncate, or slightly cuneate at the base, coarsely dentate or sometimes bidentate, everywhere sparsely pilose; petiole $7\frac{1}{2}$–10 lin. long, pilose. Inflorescence a short terminal few-flowered raceme, covered with slender glandular hairs; bracts similar in shape to the leaves but much smaller; pedicels slender, 6–10 lin. long. Calyx-segments $1\frac{1}{2}$ lin. long, $\frac{1}{4}$ lin. broad, linear, acute, glandular-hairy. Corolla sparsely and minutely pilose; tube infundibuliform, 3–$3\frac{1}{2}$ lin. long, pilose inside; limb spreading; lobes 1 lin. long and broad, subequal, obovate. Stamens included. Capsule slightly longer than the calyx, elongate-oblong.—*Chænostoma hereroense*, Engl. in Engl. Jahrb. xix. 150.

Lower Guinea. German South-west Africa: Hereroland; Hykamkab, in shady rocky places, 980 ft., *Marloth*, 1207. Usakos, on rocks, *Lindner!*

3. **S. elegantissima,** *Skan.* A slender erect glandular-pilose undershrub 1–2 ft. high or more. Branches terete, erect or spreading, elongated or sometimes only a few inches long. Leaves 4–8 lin. long, narrowly lanceolate, shortly petiolate, pinnatipartite or interruptedly pinnatifid; segments entire, irregularly dentate or subpinnatifid, obtuse. Flowers axillary, solitary; pedicels $2\frac{1}{2}$–6 lin. long, erect-spreading, rigid. Calyx $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long; segments linear, obtuse or subacute, densely glandular-pilose, especially on the margins. Corolla 4–5 lin. long, sub-infundibuliform, minutely glandular-puberulous on the lower part of the tube and on the back of the lobes, densely pilose near the top of the tube; tube somewhat unequally inflated in the upper part; limb about $2\frac{1}{2}$ lin. in diam.; lobes subequal, rounded. Stamens and style included. Capsule $1\frac{3}{4}$–$2\frac{1}{2}$ lin. long, narrowly ovoid, glabrous.—*Lyperia elegantissima*, Schinz in Verh. Bot. Ver. Brandenb. xxxi. 192.

Lower Guinea. German South-west Africa: Amboland; Ondonga, Okasima-Ka-Namutenya, and Omatope, *Schinz*, 43! 136! Oshiheke near Olukonda, *Schinz*.

4. **S. aurantiaca,** *Hiern in Cat. Afr. Pl. Welw.* i. 757. A decumbent or ascending much branched densely glandular-pubescent perennial herb or undershrub; branches 4–12 in. long, slender, terete, woody, or woody at the base and herbaceous above. Leaves 3–9 lin. long, 2–5 lin. broad, ovate to suborbicular, bipinnatisect, shortly petiolate or the upper subsessile; primary segments often stalked; secondary segments entire, linear, subacute, or deeply pinnatifid. Flowers few, solitary, in the axils of the upper leaves; pedicels 4–7 lin. long. Calyx $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; segments spathulate-linear, obtuse or subacute, entire or with 1 or 2 teeth near the apex. Corolla 3–4 lin. long, red; tube slightly inflated on the posticous side at the apex; limb about 2 lin. in diam., somewhat oblique; lobes about $\frac{3}{4}$ lin. long and broad, subequal. Stamens included. Style $1\frac{3}{4}$ lin. long; stigma capitate. Capsule as long as or slightly shorter than the calyx, ovoid, minutely puberulous. —Hiern in Dyer, Fl. Cap. iv. ii. 292. *Buchnera aurantiaca*, Burchell, Trav. S. Afr. i. 388. *Lyperia multifida*, Benth. in Hook. Comp. Bot. Mag. i. 380, and in DC. Prodr. x. 361; Schinz in Bull. Trav. Soc. Bot. Genève, vi. 70.

Lower Guinea. Angola: Pungo Andongo; banks of the River Cuanza, near Condo, *Welwitsch*, 1227! (specimen imperfect, the determination therefore doubtful).

Mozamb. Dist. Transvaal: Elim, *Mingard & Creux.*

5. **S. canescens,** *Hiern in Dyer, Fl. Cap.* iv. ii. 303. A slender erect perennial a few inches to 1½ ft. high, usually branched from the base, and more or less covered everywhere with shining whitish usually sessile sometimes shortly stalked glands; branches terete, woody at least at the base. Leaves 3–9 lin. long, 1–4 lin. broad, distinctly petiolate below, subsessile above, lanceolate, oblanceolate or elliptic, subacute, attenuated at the base, serrate-dentate or incised-dentate; teeth subacute. Flowers in elongated terminal simple or branched racemes; bracts usually leaf-like below, very small and linear above; pedicels 3–5 (rarely up to 7) lin. long, rigid, erect-spreading, usually covered with stalked glands. Calyx 1¼–1½ lin. long, deeply cleft; segments ⅓ lin. broad, linear, subacute. Corolla 5 lin. long; tube ½ lin. broad below, slightly inflated at the top; limb scarcely 2 lin. in diam.; lobes about ¾ lin. long and broad, subequal. Stamens included. Style nearly as long as the corolla-tube. Capsule 1½–2 lin. long, narrow-ovoid, obtuse. —*Lyperia canescens*, Benth. in Hook. Comp. Bot. Mag. i. 379, and in DC. Prodr. x. 359. *Chœnostoma canescens*, Wettst. ex Diels in Engl. Jahrb. xxiii. 490.

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Schinz*, 27! and in the bed of a river, *Schinz*, 31! 33!

Mozamb. Dist. British Central Africa: Western Bechuanaland; Olifant's Kloof, *Schinz*, 11! Ngamiland; Botletle Valley, *Lugard*, 268!

Also in South Africa.

6. **S. micrantha,** *Hiern in Dyer, Fl. Cap.* iv. ii. 263. A minutely glandular-puberulous perennial herb or undershrub, reaching 1 ft. high, sparingly branched; branches slender, only about ½ lin. thick, subterete. Leaves ovate or ovate-oblong, 7–12 lin. long, 3½–5 lin. broad, obtuse, pinnatifid-lobed, the upper alternate; lobes crenate-serrate or entire; petiole usually about 2½ lin. long, narrowly winged. Flowers axillary or in terminal racemes up to 6 in. long; lower bracts similar to the leaves but smaller; upper bracts 3-lobed and the uppermost linear, all except the lowest shorter than the pedicels; pedicels 3–5 lin. long. Calyx-segments oblong-spathulate or linear, about 1½ lin. long, ½ lin. broad, obtuse or obtusely acute. Corolla yellow; tube scarcely curved, 2½ lin. long, somewhat narrowly cylindric below, enlarged at the throat, where it is barely 2 lin. in diam.; limb 3 lin. in diam.; lobes ovate, very obtuse, 1 lin. long and broad. Longer stamens almost exserted. Capsule ellipsoid-ovoid, 1¼–1½ lin. long.—*S. fissifolia*, S. Moore in Journ. Bot. 1900, 467. *Lyperia micrantha*, Klotzsch in Peters, Reise Mossamb. Bot. 222. *Chœnostoma micranthum*, Engl. Pfl. Ost-Afr. C. 356; Diels in Engl. Jahrb. xxiii. 492.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; near Lupata, *Kirk!* Rio de Sena, *Peters!* British Central Africa: Rhodesia, *Gardner!* Matabeleland; Buluwayo, *Rand*, 155! banks and islands of the lower Mateugue River, *Holub*, 1312! 1313!

Also in extratropical Transvaal and Swaziland.

7. **S. blantyrensis,** *Skan.* A compact erect densely glandular puberulous undershrub about 1½ ft. high, freely branched from the base; branches 1–1½ lin. in diam. at the base, terete. Leaves 7–10 lin. long, 3½–6 lin. broad, decreasing in size upwards, ovate or ovate-lanceolate, obtuse, much attenuated at the base, irregularly dentate, incised-dentate or pinnatifid; segments obtuse, sometimes denticulate; petiole 2–4 lin. long. Flowers in lax terminal racemose inflorescences 6–9 in. long; pedicels ½–1 in. long, erect-spreading, usually slightly curved. Calyx 1¾–2 lin. long, densely glandular-puberulous; segments about ½ lin. broad, linear-oblong, slightly unequal, scarcely acute, thick. Corolla 3 lin. long, subinfundibuliform, glandular-puberulous outside; tube ¾ lin. broad at the base, slightly curved; limb 2-lipped; lobes ¾ lin. long and broad, rounded. Stamens and style included. Capsule 2¼–2¾ lin. long, ellipsoid-ovoid, slightly atttenuated at the apex, obtuse, lepidote-puberulous.

Mozamb. Dist. British Central Africa: Nyasaland; Blantyre, *Buchanan!* and in *Herb. Wood.*, 6630! Angoniland, *Sharpe*, 96!

8. **S. corymbosa,** *Hiern in Cat. Afr. Pl. Welw.* i. 757. A densely glandular-pilose herb 1–2 ft. high; branches herbaceous, ascending, 4½–8 in. long; internodes 5–7½ lin. long. Leaves ½–1¼ in. long and broad, suborbicular, cordate at the base, obtuse or subacute, crenate; petiole 5–10 lin. long. Inflorescence a 3–5-flowered cyme 1½–2 in. long; pedicels 5–10 lin. long, slender; bracteoles 1–2 lin. long, linear. Calyx-segments 4½–5 lin. long, 1–1½ lin. broad in the upper part, oblong-spathulate or narrowly oblong, obtuse. Corolla white, sparingly hairy outside; tube 6 lin. long, cylindric, hairy inside about the throat; lobes semi-oblong, 1–1½ lin. long, obtuse. Stamens included. Capsule 5 lin. long, narrowly ovoid, beaked; beak 1–1½ lin. long.—*Camptoloma rotundifolium*, Benth. in DC. Prodr. x. 431. *Chænostoma corymbosum*, Marloth & Engl. in Engl. Jahrb. x. 253. *Lyperia corymbosa*, N. E. Brown in Kew Bulletin, 1896, 163.

Lower Guinea. Angola: Elephants Bay, *Curror*, 13! German South-west Africa: Hererolaud; in sandy shady places near Daviep, 1150 ft., *Marloth*, 1461!

9. **S. Welwitschii,** *Skan.* An erect or ascending branched herb, 1–2 ft. high, sparingly covered almost everywhere with very short glandular hairs, stem and branches herbaceous; branches ascending, 4–8 in. long; internodes up to 2 in. long. Leaves alternate or sometimes subopposite, broadly ovate to orbicular, the largest 2 in. in diam., dentate-serrate, rarely almost entire, obtuse, rounded, truncate, or slightly cuneate at the base, sometimes slightly cordate; petiole ¾–1¼ in. long. Flowers axillary and solitary, or the uppermost in 2- or 3-flowered cymes about 1½ in. long; pedicels ½–1¼ in. long; bracteoles linear, about 1 lin. long. Calyx 4 lin. long, glandular-pubescent; segments oblong, obtuse, about 1 lin. broad, ciliate. Corolla 7½ lin. long, white to yellow, with purple veins, violet on the tube, sparingly hairy on the limb outside; tube 5½ lin. long, somewhat funnel-shaped, 1 lin. broad at the base,

slightly curved, hispidly hairy inside about the throat; limb slightly 2-lipped; upper lip 2-lobed; lobes broadly semi-ovate, 1 lin. long; lobes of lower lip slightly longer and narrower. Stamens included. Style 4 lin. long. Capsule glabrous, ovoid, broadly beaked, slightly longer than the calyx.—*S. corymbosa*, Hiern, var. *huillana*, Hiern in Cat. Afr. Pl. Welw. i. 757. *Chænostoma corymbosum*, Marloth & Engl., β *huillanum*, Diels in Engl. Jahrb. xxiii. 474.

Lower Guinea. Angola: Mossamedes; by the River Maiombo, near Pedra do Rei and Pedra de Sal, *Welwitsch*, 5806!

10. **S. dubia,** *Skan.* A shortly glandular-pubescent rather straggling herb, freely branched from the thick woody base; branches 1½ ft. long or more, about 1 lin. thick, ascending, herbaceous, terete, rather leafy; internodes 1½–2½ in. long. Leaves cauline, opposite or the uppermost alternate, ovate or elliptic-ovate, 6–12 lin. long, 5–9 lin. broad, acute, cuneate at the base, coarsely dentate or bidentate; petioles 3–6 lin. long. Inflorescence a short straight terminal few-flowered raceme. Bracts similar to the uppermost leaves, but smaller. Pedicels 1–2 lin. long. Bracteoles narrowly linear, shorter than the calyx. Calyx-segments linear, 2½ lin. long, slightly unequal, narrowed at the apex but scarcely acute, rather thick. Corolla salver-shaped; tube 6 lin. long, about ⅔ lin. broad, nearly cylindric, pubescent outside, colourless in the dried state; limb spreading, about 5 lin. in diam., orange-yellow, veined, rather deeply 5-lobed; lobes suborbicular, nearly equal, 1¼ lin. in diam. Stamens included; anthers subsessile, the lower oblong, the upper subreniform and much smaller than the lower. Style subfusiform, about 1 lin. long. Capsule narrowly ovoid, shorter than the calyx, obtuse, compressed at the apex, glabrous.

Lower Guinea. German South-west Africa: Great Namaqualand; Rehoboth, *Schinz*, 51!

11. **S. lyperiæflora,** *Skan.* A hirsute annual; stems 10 in. long, branched from the base. Leaves 10 in. long, 12 lin. broad, suborbicular, nearly glabrous, irregularly crenate-dentate, ciliate, the lower cordate at the base, the upper rounded; petioles of the lower leaves 1½ in. long. Flowers in racemes; bracts similar to the leaves, decreasing in size from below upwards; pedicels twice as long as the calyx. Sepals linear, obtuse. Corolla 7½ lin. long; tube elongated, quite glabrous, slightly incurved, scarcely dilated at the throat; limb 5 or 6 times shorter than the tube, 2-lipped. Longer pair of stamens exserted, the shorter included. Style entire, scarcely dilated at the apex. Capsule longer than the calyx, ovoid. Seeds rugulose.—*Urbania lyperiæflora*, Vatke in Oest. Bot. Zeitschr. 1875, 10. *Chænostoma lyperiæflorum*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 69.

Nile Land. Somaliland: Ahl Mountains, 3300 ft., *Hildebrandt*, 863a.

12. **S. tomentosa,** *Hiern in Dyer, Fl. Cap.* iv. ii. 283. A compact erect densely glandular-pubescent very viscid annual herb, 6–8 in. high, branched from the base. Leaves ¼–1 in. long, 3–9 lin. broad, ovate.

dentate, usually acute, cuneate at the base, membranous, decreasing in size upwards; petioles 2–6 lin. long. Flowers axillary, solitary, racemosely scattered from near the base to the apex of the branches; pedicels $\frac{3}{4}$–$1\frac{1}{2}$ in. long, erect-spreading, usually slightly curved, rather stout. Calyx from $2\frac{1}{2}$ lin. long in flower to $4\frac{1}{2}$ lin. long in fruit; segments narrowly linear, unequal, subacute. Corolla 8–9 lin. long, minutely pubescent; tube narrow, slightly incurved and inflated near the top; limb 4–5 lin. in diameter; lobes $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad. Stamens and style included. Capsule 3–4 lin. long, ovoid-oblong, minutely grandular-pubescent.—*Erinus tomentosus*, Thunb. Prodr. 103 and Fl. Cap. ed. Schult. 476, not of Mill. *Lyperia glutinosa*, Benth. in Hook. Comp. Bot. Mag. i. 378, and in DC. Prodr. x. 359; Engl. in Engl. Jahrb. x. 254.

Lower Guinea. German South-west Africa: Hereroland; Otyimbingue, 2950 ft., *Marloth*, 1407.

Also in South Africa.

13. **S. heucherifolia,** *Hiern in Cat. Afr. Pl. Welw.* i. 757. A divaricately much branched apparently annual herb, 4–12 in. high, villous with grey glandular hairs; branches woody, straight, almost angular. Leaves membranous, broadly ovate to suborbicular, obtuse, truncate at the base, incised-dentate, the lower 7–12 lin. long and broad, the upper much smaller; teeth shortly crenate-dentate; petiole $5\frac{1}{2}$–7 lin. long. Flowers axillary; pedicels 6–12 lin. long, very slender. Calyx-segments 2–$2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad above the middle, linear-spathulate, acute, densely villous or pubescent, unequal. Corolla white, yellowish on the tube and at the throat; tube 7–8 lin. long; limb somewhat unequal; lobes $1\frac{1}{2}$–2 lin. long, 1–$1\frac{1}{2}$ lin. broad. Capsule 2–$2\frac{1}{2}$ lin. long, narrowly ovoid.—*Chœnostoma heucherifolium*, Diels in Engl. Jahrb. xxiii. 475.

Lower Guinea. Angola; banks of the River Bero, near Cavalheiros, *Welwitsch*, 5805!

14. **S. amplexicaulis,** *Hiern in Dyer, Fl. Cap.* iv. ii. 287. An erect viscid pubescent or villous sparingly branched perennial, woody at least at the base; stems up to 1 ft. long, procumbent or dependent. Leaves sessile, crowded, often overlapping, 3–8 lin. long, 2–5 lin. broad, semi-amplexicaul or broad at the base, ovate or elliptic, usually serrate near the apex, somewhat acute, the lower opposite, the upper alternate. Flowers axillary, solitary, slightly longer than the leaves, very shortly stalked, forming a spike-like inflorescence 2–6 in. long. Calyx 3–4 lin. long; segments linear-lanceolate, acute, somewhat unequal. Corolla about 6 lin. long, glabrous outside; tube 1 lin. broad at the base, slightly contracted about the middle, somewhat incurved and dilated on the posticous side at the throat; limb $2\frac{1}{4}$ lin. broad; lobes subequal, elliptic or obovate, about 1 lin. long. Stamens and style included. Capsule 3–$3\frac{1}{2}$ lin. long, oblong-ovoid, slightly contracted near the apex, glabrous. Seeds subglobose, minutely rugose.—*Lyperia amplexicaulis*, Benth. in

Hook. Comp. Bot. Mag. i. 377, and in DC. Prodr. x. 358; Engl. in Engl. Jahrb. x. 254, and xix. 150.

Lower Guinea. German South-west Africa: Hereroland; Usakos, 2950 ft. *Marloth*, 1225; border of the Namib Plain towards Kanikontes, *Guerich*, 141.

Also in South Africa.

15. **S. Maxii,** *Hiern in Dyer, Fl. Cap.* iv. ii. 288. An erect viscid pubescent densely leafy undershrub 4 ft. high, forming a dense bush; internodes usually 4–6 lin. long. Leaves opposite or rarely alternate, sessile, 4–6 lin. long, 3–5 lin. broad, broadly ovate, entire or remotely and obscurely toothed, usually obtuse, sometimes subacute. Flowers axillary, solitary; pedicels 1 lin. long. Calyx deeply cleft, $3\frac{1}{2}$ lin. long, enlarging somewhat in the fruiting stage; segments linear-oblong, obtuse, slightly unequal. Corolla white, $\frac{2}{3}$–1 in. long; tube cylindric below, incurved and slightly gibbous on the upper side at the throat; limb 4–5 lin. broad; lobes suborbicular. Stamens included; anthers subreniform. Style included. Capsule ovoid-ellipsoid, 3–4 lin. long, obtuse, minutely emarginate, sparingly pubescent, bisulcate. Seeds globose, slightly rugose.

Lower Guinea. Angola: Mossamedes; in ravines of sandy hills near the fazenda "Boa Vista" at 200 ft., *Gossweiler*, 60! German South-west Africa: Dammaraland; on stony ground near Ubib, *Lindner!*

Also in South Africa.

16. **S. Gossweileri,** *Skan.* A compact densely grey-pubescent almost tomentose undershrub, 2 ft. high; stem terete, sparingly leafy, blackish in the dried state; branches short. Leaves alternate (lower not seen), 5–6 lin. long, 4–5 lin. broad, suborbicular to ovate, dentate, rather thick, acute or obtuse, cuneate at the base; petiole about 2 lin. long. Flowers axillary, solitary, chiefly on the branches; pedicels 3–5 lin. long. Calyx $3\frac{1}{4}$–$3\frac{1}{2}$ lin. long; segments linear, rather fleshy, somewhat unequal, subacute. Corolla yellow, 6–7 lin. long, minutely pubescent; tube straight and cylindric below, very slightly incurved and dilated on the posticous side above; limb 3 lin. in diam., rather deeply 5-lobed; lobes unequal, elliptic-oblong. Stamens included. Capsule $2\frac{1}{4}$ lin. long, oblong-ovoid, obtuse, somewhat compressed at the apex, bisulcate.

Lower Guinea. Angola: Mossamedes; in ravines of sandy hills near the fazenda "Boa Vista," 200 ft, *Gossweiler*, 62!

17. **S. Carvalhoi,** *Skan.* An erect branched undershrub $1\frac{1}{4}$ ft. high or more; stem up to $1\frac{1}{2}$ lin. in diam., terete, densely glandular-pubescent; branches rather short, erect-spreading. Leaves opposite, shortly petiolate, ovate to ovate-lanceolate, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, 3–$7\frac{1}{2}$ lin. broad, acute, cuneate at the base, slightly puberulous on the nerves beneath, serrate-crenate, with the teeth numerous and small. Flowers in a loose terminal pyramidal raceme; bracts similar to the leaves: pedicels 2–3 lin. long. Calyx 4–$4\frac{1}{4}$ lin. long, rather densely glandular-pubescent; lobes linear-lanceolate, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long, about $\frac{3}{4}$ lin. broad, acute. Corolla-tube $8\frac{1}{2}$–$9\frac{1}{2}$ lin. long, 1 lin. broad below, slightly enlarged and

curved near the apex, shortly and densely glandular-pubescent; limb $6\frac{1}{2}$–8 lin. long, 5–$6\frac{1}{2}$ lin. broad, 2-lipped; lobes obovate-truncate, 2–$2\frac{1}{2}$ lin. long and broad. Style $6\frac{1}{2}$–$7\frac{3}{4}$ lin. long. Capsule narrowly ovoid, $3\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. broad at the base, glandular-puberulous.—*Cycnium Carvalhi*, Engl. Pfl. Ost-Afr. C. 360. *C. Carvalhoi*, Engl. in Engl. Jahrb. xxiii. 513.

Mozamb. Dist. Portuguese East Africa: Gorongoza, *Carvalho!* British Central Africa: Rhodesia; Manika, on the Inyanga Mountains, 6000–7000 ft., *Evelyn-Cecil*, 198!

18. **S. grandiflora,** *Hiern in Dyer, Fl. Cap.* iv. ii. 304. An erect branched densely glandular-pubescent undershrub or small shrub, $1\frac{1}{2}$–4 ft. high; branches up to 1 ft. long or more, often robust, terete, leafy. Leaves mostly alternate, subfasciculate, shortly petiolate, lanceolate, oblong, ovate or obovate, $\frac{1}{4}$–$1\frac{1}{4}$ in. long, $1\frac{1}{2}$–4 lin. broad, acute or obtuse, cuneate at the base, serrate, glandular-hispid, scabrid, prominently nerved on the underside. Flowers in terminal racemes; racemes at first rather crowded and subcorymbose, becoming 4–7 in. long; bracts linear, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long; pedicels alternate, 3–11 lin. long, glandular-pubescent. Calyx 3–$4\frac{3}{4}$ lin. long, densely glandular-hispid; lobes linear-oblong, spathulate or sublinear, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long, obtuse. Corolla deep purple or brown-yellow; tube 8–14 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad at the base, slightly dilated and curved near the top, shortly glandular-pubescent; limb spreading, $\frac{1}{2}$–$1\frac{1}{4}$ in. in diam.; lobes obovate, 3–6 lin. long, truncate, entire or emarginate. Style about 8 lin. long. Capsule ovoid-oblong, 3–4 lin. long, minutely glandular-puberulous.—*Lyperia grandiflora*, Galpin in Kew Bulletin, 1895, 151.

Mozamb. Dist. Transvaal: Shilouvane (Silowane), *Junod*, 716!

The locality is a little to the south of the Tropic, but the plant probably occurs in Tropical Transvaal.

19. **S. burkeana,** *Hiern in Dyer, Fl. Cap.* iv. ii. 299. An erect divaricately branched densely glandular-puberulous viscid shrub 2–4 ft. high, blackish in the dried state. Leaves usually fascicled, 2–$3\frac{1}{2}$ lin. long, 1–2 lin. broad, cuneate-oblong or obovate, incised-dentate or pinnatifid, rigid, often somewhat recurved, shortly petiolate. Racemes terminal, few-flowered; bracts 1–$1\frac{1}{2}$ lin. long, linear; pedicels stout, $2\frac{1}{2}$–5 lin. long. Calyx $2\frac{1}{2}$–3 lin. long; segments linear, acute, thick, nearly equal. Corolla white, 9–11 lin. long, densely glandular-puberulous outside; tube cylindric below, slightly incurved and dilated on the upper side at the throat; limb $4\frac{1}{2}$ lin. broad; lobes subequal, $1\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. broad. Stamens included. Capsule 3–4 lin. long, narrowly ovoid, obtuse, slightly compressed at the apex, sparingly and minutely puberulous.—*Lyperia burkeana*, Benth. in DC. Prodr. x. 361; Rolfe in Oates, Matabeleland, ed. 2, 405; S. Moore in Journ. Bot. 1900, 467 (var.). *Chænostoma burkeanum*, Wettst. ex Diels in Engl. Jahrb. xxiii. 491.

Mozamb Dist. British Central Africa: Matabeleland; Buluwayo. *Rand*, 371, and without precise locality, *Baines! Oates!*

Also in South Africa.

According to Baines this is the Geel Bloemijies of South Tropical Africa. "Flowers in reality white, but used by the Boers for dyeing linen and staining wood yellow."

20. **S. atropurpurea,** *Hiern in Dyer, Fl. Cap.* iv. ii. 306. An erect or suberect slender heath-like much-branched undershrub, 1–3 ft. high, glandular-puberulous on nearly all its parts but especially on the branches; stem and branches wiry, terete. Leaves very small in alternate or sometimes opposite fascicles, linear-oblong or linear-cuneate, $\frac{3}{4}$–2 lin. long, $\frac{1}{3}$–$\frac{2}{3}$ lin. broad, obtuse, gradually narrowed to the sessile base, entire, fleshy or coriaceous, glandular-puberulous or glabrous. Flowers in loose terminal racemes. Peduncles $\frac{1}{2}$–1 in. long, minutely glandular-puberulous. Calyx-segments linear-lanceolate, $1\frac{1}{4}$–2 lin. long, rather thick. Corolla saffron, chocolate or reddish-brown, sparingly glandular outside; tube 8–12 lin. long, scarcely more than $\frac{1}{2}$ lin. broad below, slightly incurved and about 1 lin. broad at the apex; limb somewhat 2-lipped; lobes oblong or obovate, 2–3 lin. long, $\frac{3}{4}$ lin. broad, obtuse. Stamens included. Capsule narrowly ovoid, 3–6 lin. long, $1\frac{1}{3}$ lin. broad, glandular-pulverulent or glabrous.—*Lyperia atropurpurea*, Benth. in Hook. Comp. Bot. Mag. i. 380; S. Moore in Journ. Bot. 1900, 467. *L. crocea*, Ecklon ex Benth. in DC. Prodr. x. 361. *Chænostoma croceum*, Wettst. ex Diels in Engl. Jahrb. xxiii. 491.

Mozamb. Dist. British Central Africa: Matabeleland; Buluwayo, *Rand*, 370! Ngamiland; Botletle Valley, *Lugard*, 267!

21. **S. huillana,** *Hiern in Cat. Afr. Pl. Welw.* i. 757. An erect undershrub covered with sessile or stalked glands; stem 8–16 in. high, rigid, rather thick; branches several, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long. Leaves fasciculate, petiolate or subsessile, cuneate, coriaceous; blade 2–6 lin. long, $1\frac{1}{4}$–3 lin. broad towards the apex, dentate at the apex; petioles scarcely $3\frac{1}{2}$ lin. long. Floral leaves subentire, 2 or 3 times shorter than the peduncles. Flowers in a loose terminal raceme; pedicels 3–8 in. long, becoming 1 in. long in fruit. Calyx-segments narrowly lanceolate, $1\frac{1}{2}$–2 lin. long, rather obtuse. Corolla brilliantly purple-red; tube 8–12 lin. long, slender, $\frac{1}{3}$ lin. broad below, about 1 lin. broad at the apex, thinly covered with very shortly stalked glands; limb slightly 2-lipped, 4–5 lin. in diam.; lobes obovate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, $1\frac{1}{2}$–2 lin. broad, emarginate or obcordate, covered with sessile glands on the back. Stamens included. Capsule $2\frac{1}{2}$–3 lin. long, $1\frac{1}{4}$ lin. broad.—*Chænostoma huillanum*, Diels in Engl. Jahrb. xxiii. 477.

Lower Guinea. Angola: between Mumpulla and Arroiol do Caionda, *Welwitsch*, 5834! Huilla, *Antunes*, 117.

Imperfectly known species.

22. **Lyperia pedicellata,** *Klotzsch in Peters, Reise Mossamb. Bot.* 223. An erect unbranched lepidote-puberulous herb 5 in. high. Stem terete. Leaves 8 lin. long, 3 lin. broad, subpinnately lobed or incised, membranous, the lower leaves opposite, the upper alternate and smaller; segments short, linear, obtuse. Flowers axillary; pedicels 5–6 lin.

long, filiform. Calyx-segments 1 lin. long, linear, subacute, connivent. Corolla 2 lin. long, ringent, lepidote; limb subbilabiate; lobes short, entire, obtuse. Stamens and style included. Capsule with scattered very minute whitish scales.—*Chænostoma pedicellatum*, Engl. in Engl. Pfl. Ost-Afr. C. 356.

Mozamb. Dist. Portuguese East Africa: Rios de Sena; banks of the Zambesi, *Peters*.

23. **Chænostoma lyperioides,** *Engl. in Engl. Jahrb.* x. 253. Minutely and densely glandular-pilose. Branches spreading, 8–12 in. long; internodes $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves $7\frac{1}{2}$–10 lin. long and broad, ovate, triangular at the base, coarsely serrate, sometimes biserrate; lateral nerves 2 or 3 on each side, immersed above, prominent below; petiole 3–5 lin. long. Inflorescence a many-flowered raceme, 2–6 in. long; bracts lanceolate or the uppermost linear; pedicels $7\frac{1}{2}$–12 lin. long, densely pilose. Calyx densely pilose; segments $2\frac{1}{2}$–3 lin. long, narrowly linear, acute. Corolla orange-yellow; tube $7\frac{1}{2}$ lin. long, slightly curved; lobes oblong, $2\frac{1}{2}$ lin. long, 1–$1\frac{1}{2}$ lin. broad. Capsule oblong, $2\frac{1}{2}$ lin. long, $1\frac{1}{2}$ lin. in diam., acute. Seeds very minute, ovoid, concave on one side.

Lower Guinea. German South-west Africa: Hereroland; Mount Kaiser Wilhelm, near Okahandya, 4600 ft., *Marloth*, 1351.

18. **MIMULUS**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 946.

Calyx tubular, more rarely campanulate, 5-angled, 5-toothed or more rarely 5-fid. Corolla-tube cylindric, sometimes rather broad or ventricose, sometimes elongated and slender, equal or somewhat enlarged at the throat; posticous lip outside, 2-lobed, erect, reflexed at the sides, or spreading and flat; anticous lip spreading, 3-lobed, bigibbose at the base and prominent almost closing the throat, or concave; lobes rounded, subequal. Stamens 4, didynamous, affixed near the base of the corolla-tube, included or exserted under the posticous lip; filaments filiform; anthers glabrous or pilose on the back; cells divergent or divaricate, distinct or confluent at the apex. Style filiform, bilamellate at the apex. Capsule oblong or linear, dehiscence loculicidal; valves entire, rarely bifid. Decumbent or erect, glabrous or pilose, sometimes viscid herbs, more rarely undershrubs. Leaves opposite, entire or dentate. Flowers axillary, solitary or racemose; pedicels ebracteate. Corolla usually showy.

Species about 90, in extratropical and mountainous regions of America, Asia, Australia and Africa; numerous in Western North America.

1. **M. gracilis,** *R. Br. Prodr.* 439. A glabrous perennial, $\frac{3}{4}$–$1\frac{3}{4}$ ft. high; stem usually erect, stout, simple or branched from the base, quadrangular, very narrowly 4-winged. Leaves $\frac{3}{4}$–2 in. long, 2–5 (usually $2\frac{1}{2}$) lin. broad, decreasing in size in the upper part of the stem, lanceolate to narrowly oblong, obtuse, subacute or sometimes almost

acuminate, usually amplexicaul, entire and slightly repand or remotely denticulate. Flowers solitary, axillary, forming rather leafy loose racemes; pedicels $\frac{3}{4}$–1 in. long, up to $1\frac{3}{4}$ in. long in the fruiting stage, suberect. Calyx $3\frac{1}{2}$–4 lin. long, 5-angled; teeth broad at the base, 1–$1\frac{1}{4}$ lin. long, unequal, subacuminate, keeled. Corolla about 7 lin. long, whitish, whitish-violet or white-rosy (*Welwitsch*), tubular, very unequally bilabiate; upper lip short, emarginate; lower lip broadly 3-lobed. Capsule very slightly shorter than the calyx, obovoid.—Benth. in DC. Prodr. x. 369 and 594; Hook. f. Fl. Brit. Ind. iv. 259; Hiern in Cat. Afr. Pl. Welw. i. 758, and in Dyer, Fl. Cap. iv. ii. 354; S. Moore in Journ. Bot. 1900, 467. *M. angustifolius*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 119. *M. strictus*, Benth. in Wall. Cat. n. 3918, and Scroph. Ind. 28.

Nile Land. Abyssinia: Sana; Bahara District, *Schimper*, 1629! Begemeder, *Schimper*, 1135!

Lower Guinea. Angola: Pungo Andongo; banks of the River Luxillo, *Welwitsch*, 5874! West Luxillo River, *Welwitsch*, 5855! Mossamedes; near the River Bero, *Welwitsch*, 5807, 5808. Huilla; by the Lopollo stream, *Welwitsch*, 5796! Malange, *Gossweiler*, 1087!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; near Expedition Island, *Kirk!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 143! Zomba and east end of Lake Shirwa, *Meller!* Matabeleland; Buluwayo, *Rand*, 156, 368, 506, *Gardner*, 70!

Also in South Africa, China, India and Australia.

19. **LINDENBERGIA**, Lehm.; Benth. et Hook. f. Gen. Pl. ii. 948.

Calyx campanulate, 5-fid. Corolla bilabiate; tube cylindric; posticous lip inside, short, broad, emarginate or 2-lobed, erect-spreading; anticous lip larger, 3-lobed, spreading. Stamens 4, didynamous, included; filaments filiform; anther-cells distinct, separated, stipitate, all bearing pollen. Style filiform, subclavate at the apex. Capsule oblong or ovoid, bisulcate, dehiscence loculicidal; valves entire Seeds many, minute, semi-immersed in the fleshy placentas.—Annual or perennial herbs, hard at the base, rarely undershrubs, decumbent or ascending, villous or more rarely glabrescent. Leaves opposite or the upper alternate, dentate. Flowers subsessile, solitary in the axils of the leaves or in terminal spikes or racemes; bracts foliaceous; bracteoles 0.

Species 14, in North-east Africa, Arabia, India, Malaya and China.

Annual; corolla glabrous	1. *L. nigrescens.*
Perennial; corolla pubescent.	
Leaves $2\frac{1}{2}$–4 lin. long, denticulate, the lower scarcely larger than the upper; corolla $4\frac{1}{2}$–$5\frac{1}{2}$ lin. long	2. *L. scutellarioides.*
Leaves up to $2\frac{3}{4}$ in. long, coarsely toothed, the lower larger than the upper; corolla 7–8 lin. long.	
Lower leaves broadly ovate or suborbicular-ovate.	
Leaves up to about 7 lin. long, the uppermost shorter than the calyx; calyx $1\frac{1}{2}$–2 lin. long	3. *L. sinaica.*

Leaves up to $2\frac{3}{4}$ in. long, the uppermost usually longer than the calyx; calyx 3–4 lin. long	4. *L. abyssinica.*
Lower leaves oblong-lanceolate	5. *L. virens.*

1. **L. nigrescens,** *Vatke in Oest. Bot. Zeitschr.* 1875, 10. A slender annual herb 6 in. high, branched from the base, drying black, having glandular hairs mixed with a dense indumentum. Leaves 10 lin. long, suborbicular-ovate, acute, dentate; upper floral leaves longer than the calyx; petiole 5 lin. long. Raceme many-flowered; flowers opposite, secund. Calyx rather glabrous. Corolla 3 times longer than the calyx, glabrous. Capsule somewhat villous.—Vatke in Linnæa, xliii. 306, in note.

Nile Land. Somaliland; Ahl Mountains at Yafir, 6500 ft., *Hildebrandt,* 863 C.

2. **L. scutellarioides,** *Aschers. in Schweinf. Beitr. Fl. Aethiop.* 241. An erect branched undershrub 12–14 in. high, subglabrate below, elsewhere covered with a dense canescent pubescence with which are sparingly mixed longer glandular hairs. Leaves $2\frac{1}{2}$–4 lin. long and broad, the uppermost only slightly smaller than the lower, ovate to suborbicular, rounded at the base, acute, denticulate, very shortly petiolate. Flowers axillary; peduncles $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Calyx $1\frac{3}{4}$ lin. long, shorter than the leaves except in a few of the uppermost flowers; teeth $\frac{1}{3}$ lin. long. Corolla $4\frac{1}{2}$–$5\frac{1}{2}$ lin. long. Capsule longer than the calyx; shortly pubescent.—*Hemiorchis habessinica,* Ehrenb. ex Aschers. l.c.

Nile Land. Eritrea: Dahlac Island near Massowa, *Ehrenberg!*

3. **L. sinaica,** *Benth. Scroph. Ind.* 22. A divaricately much branched densely glandular-pilose undershrub; branches up to about 1 ft. long. Lower leaves suborbicular-ovate or ovate, 3–7 lin. long and broad, usually shortly petiolate, coarsely crenate-dentate, acute or obtuse, rounded or cuneate at the base; uppermost leaves sessile, smaller, shorter than the calyx. Flowers opposite in loose secund racemes 6–12 in. long; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Calyx $1\frac{1}{2}$–2 lin. long, densely glandular pilose; teeth ovate or ovate-elliptic, unequal, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, acute. Corolla 7–8 lin. long. Capsule oblong, slightly longer than the calyx, glandular-pilose above.—DC. Prodr. x. 377; Boiss. Fl. Orient. iv. 425; Almagià in Ann. Istit. Bot. Roma, viii. 139. *Bovea sinaica,* Decaisne in Ann. Sci. Nat. 2me sér., ii. 253.

Nile Land. Red Sea: Harnish Island, *Slade,* 12! Eritrea: various localities, *Terracciano & Pappi.*

Also in Egypt, Arabia and Socotra.

4. **L. abyssinica,** *Hochst. ex Benth. in DC. Prodr.* x. 377. A divaricately branched glandular-pubescent or pilose perennial herb or undershrub. Leaves $\frac{1}{2}$–2 in. long, $\frac{1}{3}$–$1\frac{3}{4}$ in. broad in the lower part of the branches, gradually decreasing in size in the upper part, the uppermost

usually longer than the calyx, usually broadly ovate, often cuneate, sometimes rounded, truncate or slightly cordate at the base, coarsely crenate-dentate or acutely dentate, petiolate to subsessile. Flowers opposite in leafy terminal secund racemes; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Calyx 3–4 lin. long; teeth broadly lanceolate or ovate, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, shortly acuminate. Corolla 7–8 lin. long. Capsule slightly longer than the calyx, pubescent.—A. Rich. Tent. Fl. Abyss. ii. 120; Hook. f. Fl. Brit. Ind. iv. 262. *L. sinaica*, Vatke in Linnæa, xliii. 306, not of Benth. *L. sinaica*, Benth., var. *abyssinica*, Almagià in Ann. Istit. Bot. Roma, viii. 140.

Nile Land. Nubia: Hor Tamanib, near Suakin, 500–600 ft., *Lord!* Wadi O-Mareg, *Schweinfurth*, 427! coast region, *Bent!* Eritrea: Dogali and near Saati, *Schweinfurth & Riva*, 257! 360! and various localities, *Terracciano & Pappi*. Abyssinia: near Jelajeranne, *Schimper*, 1619! and without precise locality, *Schimper*, 782! Somaliland: Ahl and Serut Mountains, near Maid, 3300–5900 ft., *Hildebrandt*, 1406! and without precise locality, *Mrs. Lort Phillips!*

Also in North-western India.

L. Pirottæ, Almagià in Ann. Istit. Bot. Roma, viii. 140, from Dahlac Island, Eritrea, I have not seen. We can find nothing in the description by which to distinguish it satisfactorily from *L. abyssinica*.

5. **L. virens,** *Vatke in Linnæa*, xliii. 306. A shortly glandular-villous perennial (?) herb; stem branched in the upper part; branches ascending. Leaves petiolate, crenate-dentate except at the base; lower leaves up to $2\frac{3}{4}$ in. long, about 2 in. broad, oblong-lanceolate, narrowed at the base; uppermost leaves smaller, suborbicular, contracted into a petiole; petiole $2\frac{1}{2}$–$7\frac{1}{2}$ lin. long. Flowers in pairs, forming a leafy raceme; pedicels about $1\frac{1}{2}$ lin. long. Calyx $3\frac{1}{2}$ lin. long, often shorter than the floral leaves. Corolla 8 lin. long.

Nile Land. Eritrea: Buri, near Massowa, *Hildebrandt*, 741 A.

In Vatke's description we can find nothing to separate this species from *L. abyssinica* except the oblong-lanceolate lower leaves.

20. **STEMODIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 950.

Calyx 5-partite; segments narrow, imbricate, equal or subequal. Corolla-tube cylindric; upper outside lip suberect, broad, entire or emarginate; lower lip spreading, 3-lobed, not plicate at the base. Stamens 4, didynamous, included; filaments filiform; anther-cells distinct, stipitate, all bearing pollen. Style dilated at the apex, usually 2-lobed. Capsule globose, ovoid or acuminate; dehiscence usually loculicidal, sometimes septicidal; valves 2, bifid, or 4. Seeds many, small, striate and usually reticulate.—Glandular-pubescent or villous, often aromatic herbs, or sometimes undershrubs. Leaves opposite or verticillate. Flowers solitary in the axils of the leaves or the upper in a crowded leafy spike; pedicels 1- or 2-bracteolate. Corolla bluish.

Species about 30, the others in South America, Tropical Asia and Australia.

1. **S. serrata,** *Benth. in DC. Prodr.* x. 381. An erect much branched viscid glandular-pubescent herb, 6 in. to 1 ft. high. Leaves rather crowded, up to 2 in. long, 2–6 lin. broad, oblong or lanceolate, acute, narrowed at the base or sometimes dilated and semi-amplexicaul, serrate from the middle to the apex. Flowers crowded, forming leafy spike-like racemes; peduncles $\frac{1}{2}$–$1\frac{1}{2}$ lin. long; bracts 2, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, narrow-linear, inserted near the calyx. Calyx $2\frac{3}{4}$ lin. long; segments subulate-linear, acuminate. Corolla about 3 lin. long; upper lip emarginate; lower lip broadly and very shortly 3-lobed. Capsule as long as the calyx, narrow-oblong, acuminate, glabrous, 4-furrowed.—Hook. f. Fl. Brit. Ind. iv. 265. *Sutera serrata,* Hochst. in Flora, 1841, i. Intell. 43, name only.

Upper Guinea. Senegambia, *Leprieur!* Senegal, *Roger!*

Nile Land. Kordofan: Mount Kohn, *Kotschy,* 226! Mount Arashkol, *Kotschy,* 199! Upper Sennar: Fazokel, *Kotschy,* 521! White Nile, at Els-Ehs, *Schweinfurth,* 979!

Mozamb. Dist. British Central Africa: Boruma, on the Zambesi, *Menyharth,* 1070!

Also in India.

Imperfectly known species.

2. **S. senegalensis,** *Desf. Cat. Hort. Par.* ed. iii. 107, without description.

21. STEMODIOPSIS, Engl. in Ann. Istit. Bot. Roma, vii. 25.

Calyx 5-partite; segments linear-lanceolate, very acute. Corolla-tube subcampanulate, not spurred nor saccate at the base; limb 2-lipped; upper lip outside, concave, semiorbicular or broadly ovate, very shortly 2-lobed; lower lip rather larger than the upper, shortly 3-lobed, having (at least in *S. Buchanani*) a prominent palate. Perfect stamens 4, didynamous, included and covered by the upper lip of the corolla; filaments of the longer stamens twisted in the middle or merely curved; anthers 2-celled; cells ovoid, equal, confluent at the apex, diverging at a right angle or almost divaricate, dehiscing longitudinally; staminode filiform, sometimes minute or quite wanting. Ovary elongate-conical, 2-celled, as long as or nearly as long as the calyx, attenuated into a slender style; ovules numerous in each cell. Capsule septicidal, ellipsoid-conical, sharply beaked, turned downwards; valves 2, coherent or connivent at the apex after dehiscence.—Herbs, sometimes almost subshrubby, with many rather densely leafy branches. Leaves opposite, petiolate, spathulate or ovate, dentate. Flowers very small, axillary, solitary or sometimes in 3-flowered cymes; pedicels minutely bibracteolate.

Species 3, endemic.

Leaves spathulate; petiole 1–$1\frac{1}{2}$ lin. long; pedicels nearly as long as the leaves . . . . . 1. *S. Rivæ.*

Leaves ovate; petiole 3–18 lin. long; pedicels very much shorter than the leaves.
Plant very sparingly pubescent or almost glabrous; corolla 2–2½ lin. long . . . . . 2. *S. Buchanani.*
Plant densely pubescent; corolla 4 lin. long . . 3. *S. humilis.*

1. **S. Rivæ,** *Engl. in Ann. Istit. Bot. Roma*, vii. 25. Subshrubby; stems curved-ascending, very much branched, densely and shortly cinereous-pilose on the younger parts and on the petioles, at length glabrescent; primary branches 6–10 in. long, the secondary and tertiary shorter. Leaves spathulate; blade 1½–2½ lin. long and broad, few-toothed in the upper part, very shortly and sparsely pilose on both sides, narrowed at the base into a slender petiole 1–1½ lin. long. Flowers solitary; pedicels nearly as long as the leaves; bracteoles subulate, ½ lin. long. Calyx shortly and sparsely pilose; segments 1¼–1½ lin. long. Corolla very minutely pilose; tube 2¼ lin. long; upper lip about 1 lin. long; lobes of the lower lip ¾ lin. long. Filaments of the longer stamens about 1½ lin. long, of the shorter ¾ lin. long; anther-cells ¼ lin. long; staminode ¾ lin. long. Ovary ellipsoid-conical, about 1½ lin. long.—Engl. Jahrb. xxiii. 497, t. 7, figs. A–F.

Nile Land. Somaliland: Galla Territory; Mount Robé, near the source of the River Daua, *Riva*, 162.

2. **S. Buchanani,** *Skan.* A perennial herb about 6 in. high, furnished chiefly on the leaves with a few weak scattered hairs and somewhat pulverulent or almost glabrous; stem procumbent, sometimes rooting, rather woody, about 1 lin. thick, subterete, very much branched; branches very weak and slender, ascending, angular, 3–6 in. long; internodes 3–14 lin. long. Leaves ovate; blade 3–16 lin. long, 2–8 lin. broad, acute, more or less cuneate at the base, very thin, dentate; teeth usually 5 each side, rather coarse in the larger leaves; petiole 3–18 lin. long, narrowly 3-winged. Flowers solitary or sometimes in 3-flowered cymes; pedicels filiform, ¾–1½ lin. long, ascending in flower, sharply decurved in fruit; bracteoles very narrowly linear, ½–⅔ lin. long. Calyx-segments narrowly linear-triangular, slightly unequal, 1¼–1½ lin. long, ¼–⅓ lin. broad at the base. Corolla 2–2½ lin. long; tube 1¼–1¾ lin. long, about ⅔ lin. broad at the base, slightly enlarged upwards: upper lip broadly ovate, about ¾ lin. long and 1 lin. broad at the base; lobes minute, rounded or somewhat triangular; lower lip broadly obovate or suborbicular, about ⅔ lin. long, ¾–1¼ lin. broad; lobes minute, rounded; palate pubescent. Filaments of the longer stamens about 1 lin. long, of the shorter about ¾ lin. long; staminode about ⅓ lin. long, inserted near the base of the corolla-tube, sometimes absent. Style scarcely 1 lin. long. Capsule ellipsoid-conical, 2½–3 lin. long, rather abruptly beaked, 2-furrowed, turned downwards; beak ¾–1½ lin. long. Seeds cylindric, ½–⅔ lin. long, nearly ¼ lin. thick, whitish, very slightly several-furrowed.

Mozamb. Dist. British Central Africa: Nyasaland, *Buchanan*, 365! 1220!

I have not seen a specimen of *S. Rivæ*, the type of *Stemodiopsis*, but, judging

from the description and figure of this species I have little doubt that Buchanan's specimens belong to the same genus, notwithstanding the presence of a distinct palate in the corolla which Engler does not mention at all. The stamens appear to be the same except that the longer filaments in *S. Buchanani* are merely curved, not twisted.

Buchanan's 1220 differs from his 365 in several respects. The former has much larger almost quite glabrous leaves, longer petioles, flowers often 3 together, longer and narrower calyx-segments and longer capsules. This specimen appears as if it had grown in wet places and the other in dry stony soil.

3. **S. humilis,** *Skan.* A perennial herb branched from the base, the whole plant so far as known less than $1\frac{1}{2}$ in. high, densely covered with short stiff whitish hairs; branches ascending or spreading, slender, $\frac{3}{4}$–$1\frac{1}{4}$ in. long. Leaves ovate; blade 3–4 lin. long, $1\frac{3}{4}$–$3\frac{1}{2}$ lin. broad, acute, cuneate at the base, serrate; teeth 3 or 4 each side, rather coarse; petiole $2\frac{1}{2}$–3 lin. long, slender, triangular. Flowers solitary; pedicels filiform, $1\frac{3}{4}$ lin. long; bracteoles setaceous, scarcely $\frac{3}{4}$ lin. long. Calyx-segments narrowly linear-triangular, slightly unequal, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, about $\frac{1}{4}$ lin. broad at the base, densely covered with rather short stiff spreading hairs. Corolla 4 lin. long; tube $2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad at the base, enlarged upwards; upper lip deltoid-ovate, about $1\frac{3}{4}$ lin. long, $1\frac{3}{4}$ lin. broad at the base, shortly 2-lobed, slightly fimbriate; lower lip $1\frac{3}{4}$ lin. long and broad, very shortly 3-lobed, shortly pubescent inside. Filaments of the longer stamens about $1\frac{3}{4}$ lin. long, curved at the base, of the shorter about 1 lin. long; staminode filiform, $\frac{1}{2}$ lin. long. Style $1\frac{3}{4}$ lin. long. Capsule ellipsoid-conical, about 3 lin. long, rather abruptly beaked, 2-furrowed, turned downwards, very sparingly beset with short stiff hairs. Seeds as in *S. Buchanani.*

Mozamb. Dist. British Central Africa: Nyasaland; near Mount Chiradzulu, *Cameron,* 182!

Very near *S. Buchanani,* but it is much more pubescent and the flowers are about as large again. The striking difference in the size of the plants of the two species is probably accidental.

22. **LIMNOPHILA,** R. Br.; Benth. et Hook. f. Gen. Pl. ii. 950.

Calyx 5-partite; segments narrow, imbricate, subequal or the posticous larger. Corolla-tube cylindric; upper outside lip suberect, broad, entire or shortly bifid; lower lip spreading, 3-fid, not plicate at the base. Stamens 4, didynamous, included; filaments filiform; anther-cells separate and usually stipitate, more rarely subcontiguous. Style deflexed at the apex with two short stigmatose lamellæ. Capsule broadly ovate or oblong, usually obtuse, dehiscence septicidal and loculicidal; valves 4. Seeds many, small, striate, reticulate.—Glabrous or slightly pubescent herbs, often aromatic and having pellucid dots, usually growing in marshy places. Leaves opposite or verticillate, dentate or incised or the submerged leaves divided into capillary segments. Flowers axillary, solitary, pedicellate, the upper often forming a terminal raceme; bracts small, linear, inserted under the calyx.—*Ambulia,* Lam. Encycl. i. 128.

Species about 30, chiefly in the warmer parts of Asia, Australia and Africa.

Leaves opposite (rarely the lower verticillate).
- Plant up to 18 in. high; leaves elliptic-ovate . . 1. *L. Barteri.*
- Plant 1–2 in. high; leaves lanceolate or sublinear . 2. *L. tenera.*

Leaves verticillate (the uppermost sometimes opposite).
- Flowers sessile or subsessile.
  - Flowers axillary, rather distant.
    - Leaves with capillary segments; bracts longer than the calyx . . . . . 3. *L. ceratophylloides.*
    - Leaves with narrowly linear segments; bracts shorter than the calyx . . . . 4. *L. sessiliflora.*
  - Flowers rather crowded in short terminal spikes . 5. *L. dasyantha.*
- Flowers distinctly stalked . . . . . 6. *L. gratioloides.*

1. **L. Barteri,** *Skan.* A gland-dotted herb, everywhere densely pilose or glabrescent below. Stems ascending, 9–18 in. high, sparingly branched. Leaves opposite (rarely in whorls of about 10 near the base, pinnatifid), 4–8 lin. long, 2–4½ lin. broad, elliptic-ovate, serrulate, semiamplexicaul, obtuse or subacute. Flowers sessile or subsessile, axillary, sometimes forming terminal or short lateral distant-flowered spikes; bracteoles 2, inserted on the base of the calyx, 1⅕ lin. long, linear-lanceolate, scarcely acute, pilose. Calyx 1¼–1½ lin. long, pilose and sprinkled with yellowish glands; segments unequal, subacuminate or subacute. Corolla apparently yellow, 1½–1¾ lin. long; tube ⅗ lin. broad. Anther-cells subcontiguous at the base. Style 1 lin. long. Capsule 1½ lin. long, broadly ovoid, obtuse, glabrous, bisulcate. Seeds globose-ellipsoid, very minutely tuberculate.

Upper Guinea. Sierra Leone: Lomaburu, *Scott-Elliot,* 5032! Southern Nigeria?, *Barter,* 751!

2. **L. tenera,** *Skan.* A nearly glabrous erect cæspitose apparently annual herb 1–2 in. high; stems numerous; branches spreading. Leaves opposite, 1–4 lin. long, lanceolate or sublinear, scarcely acute or subapiculate, entire, sessile, semiamplexicaul. Flowers axillary and terminal or quasi-terminal, mostly alternate, solitary, about 2 lin. long; pedicels 1½–3 lin. long; bracteoles 1–1⅕ lin. long, subulate. Calyx 1⅕–1½ lin. long, 5-partite; segments subulate, erect or at length reflexed. Corolla whitish to pale blue, slightly glandular-puberulous outside, somewhat pilose about the throat inside. Capsule ⅗ lin. long. Seeds netted-areolar, irregularly ovoid.—*Stemodiacra tenera,* Hiern in Cat. Afr. Pl. Welw. i. 759. *Stemodia tenera,* K. Schum. in Just, Jahresber. xxvi. i. 395. *Ambulia tenera,* Engl. & Gilg in Warb. Kunene-Samb. Exped. 362, in note.

Lower Guinea. Angola: Pungo Andongo; swampy places at Lake Quibinda, *Welwitsch,* 1241!

3. **L. ceratophylloides,** *Skan.* A herb with the habit of a *Ceratophyllum,* wholly submerged or the upper part emerged at the time of flowering; stems about a foot long, slender, glabrous, branched, densely leafy above, leafless below. Leaves ¾–1 in. long, verticillate, all

multifid; segments capillary, sparingly pilose. Flowers axillary, subsessile; bracteoles capillary, about 1 lin. longer than the calyx. Calyx $2\frac{1}{4}$ lin. long, membranous, glabrous, gland-dotted, 5-fid; teeth about 1 lin. long, obtusely acuminate. Capsule ellipsoid, $1\frac{1}{2}$ lin. long, bisulcate, emarginate. Seeds (unripe) rather large, several, ellipsoid-ovoid, smooth, with a protruding hyaline aril at the base.—*Stemodiacra ceratophylloides*, Hiern in Cat. Afr. Pl. Welw. i. 759. *Stemodia ceratophylloides*, K. Schum. in Just, Jahresber. xxvi. i. 395. *Ambulia ceratophylloides*, Engl. & Gilg in Warb. Kunene-Samb. Exped. 362, in note.

Lower Guinea. Angola: Huilla; streams and pools between Lopollo and Humpata, in Moro de Lopollo, and on the Humpata Plateau near Nene, *Welwitsch*, 5778!

4. **L. sessiflora,** *Blume, Bijdr.* 749. An annual with crowded glabrous or pubescent sparingly branched floating or partly submerged stems. Leaves verticillate, 4–8 lin. long; submerged leaves multifid, with long narrowly linear lobes; upper leaves incised or dentate. Flowers axillary, sessile or subsessile; bracts linear, shorter than the calyx. Calyx membranous, 2 lin. long, shortly pubescent outside or glabrous, gland-dotted, 5-fid; teeth $\frac{3}{4}$ lin. long, rather acute. Corolla $3\frac{1}{2}$–4 lin. long, violet-whitish tinged with yellow on the tube. Anthers coherent in pairs; cells very shortly stipitate. Style $1\frac{1}{2}$ lin. long, bilamellate at the apex. Capsule shorter than the calyx, bisulcate, somewhat compressed. Seeds obtusely angular.—Hook. f. Fl. Brit. Ind. iv. 270; Benth. in DC. Prodr. x. 389. *Stemodiacra sessiliflora*, Hiern in Cat. Afr. Pl. Welw. i. 758. *Ambulia Baumii*, Engl. & Gilg in Warb. Kunene-Samb. Exped. 361, t. 7, figs. F, G.

Lower Guinea. Angola: Huilla; in streams, from Lopollo to Nene and towards Ohai, *Welwitsch*, 5776! and from Lopollo to Catumba, *Welwitsch*, 5777! Amboella; Kutue River, 3900 ft., *Baum*, 750!

Also in India, Ceylon, Java, China and Japan.

5. **L. dasyantha,** *Skan.* An aquatic herb with stems up to $2\frac{1}{2}$ ft. long, leafless below. Lower leaves in whorls of about 10, $1\frac{1}{4}$ in. long, multipartite, segments long, capillary, sparingly pilose; upper leaves opposite, 2–3 lin. long, narrowly oblong to broadly ovate, semiamplexicaul, minutely dentate, gland-dotted. Flowers sessile, alternate, rather crowded in short terminal spikes; bracts alternate, narrowly oblong, rather longer than the calyx. Calyx membranous, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, sparingly pilose, gland-dotted; teeth $\frac{3}{4}$–1 lin. long, ovate, subacute. Corolla 6–8 lin. long, yellow; tube pilose outside and inside; upper lip 1 lin. long, shortly 2-lobed; lower lip 2 lin. long, deeply 3-lobed. Anthers free or coherent in pairs; connective flat, suborbicular; cells very shortly stipitate. Style biauriculate just below the apex. Capsule $1\frac{1}{2}$ lin. long, ellipsoid, glabrous, 4-valved. Seeds $\frac{1}{3}$ lin. long, pallid, scrobiculate.—*Ambulia dasyantha*, Engl. & Gilg in Warb. Kunene-Samb. Exped. 362, t. 7, figs. A–E.

Upper Guinea. Sierra Leone: stagnant water near Bentembu, *Scott-Elliot*, 5862.

Lower Guinea. Angola : River Quiriri, near Sakkemecho, 3900 ft., *Baum*, 729!

6. **L. gratioloides,** *R. Br. Prodr.* i. 442. Stems slender, glabrous or minutely glandular-pubescent above, branched or simple, from a few inches to upwards of 2 ft. (usually about 6 in.) long. Leaves very variable; lower submerged ones in whorls of 6 to many, usually multifid; upper whorled or sometimes opposite, dentate, incised or multifid; uppermost opposite, linear to elliptic-oblong. Flowers axillary; pedicels 2–6 lin. long, usually glandular-pubescent; bracteoles setaceous, obtuse, 1–1½ lin. long. Calyx 2–2½ lin. long, membranous, glandular-pubescent and gland-dotted; teeth ¾ lin. long, scarcely acute. Corolla 3–4 lin. long. Anthers coherent in pairs, or those of the shorter stamens alone coherent; cells very shortly stipitate. Style bent near the apex with 2 minute auricles at the bend. Capsule somewhat shorter than the calyx, glabrous.—Hook. f. Fl. Brit. Ind. iv. 271; S. Moore in Journ. Bot. 1900, 467. *Ambulia gratioloides*, Baill. ex Engl. Pfl. Ost-Afr. C. 357; Engl. Jahrb. xxx. 401.

Upper Guinea. Senegal, *Roger!* Togo : near Lome, *Warnecke*, 230!

Nile Land. British East Africa: Jur : Jur Ghattas, *Schweinfurth*, 2603! Gazelle River, at the mouth of the Bahr el Arab, *Schweinfurth*, 1186!

Mozamb. Dist. German East Africa : Northern Kinga Mountains; Ussangu, 4000 ft., *Goetze*, 1030! Portuguese East Africa! Quilimane, *Scott!* British Central Africa: Rhodesia; Salisbury, *Rand*, 518!

Also in Beluchistan, India, China, Malaya and Australia.

Var. *nana*, Skan. An erect herb 1–1½ in. high. Leaves in crowded whorls of 6–8, 2½–3½ lin. long, multifid; segments ½–1½ lin. long, narrowly linear, Flowers subterminal. Corolla white.

Upper Guinea. Northern Nigeria: Nupe; sandy margin of a small lake near Jeba, *Barter*, 1709!

23. **MONIERA,** B. Juss. ex P. Browne, Hist. Jamaic., 269, t. 28, fig. 3.

Calyx 5-partite; segments imbricate; posticous broader; lateral innermost, often very narrow. Corolla-tube cylindric; lips spreading; upper outside, emarginate or 2-lobed; lower 3-lobed; lobes all equal or the 2 upper more connate. Stamens 4, didynamous, included: anthers approximated in pairs or subdistant; cells contiguous, distinct, parallel or divergent. Style dilated at the apex, entire or shortly 2-lobed; stigma terminal. Capsule globose or ovoid, bisulcate, loculicidal and usually septicidal; valves 2 or 4. Seeds many, small.—Erect, diffuse, prostrate or floating herbs, glabrous or more rarely pubescent, often punctate. Leaves opposite, quite entire, dentate or, in aquatic species, multisect into capillary segments when submerged. Flowers axillary, solitary, sessile or pedunculate, or the upper racemose; peduncles 1- or 2-bracteate or naked. Corolla yellow, pale blue or white. Hypogynous disk in some species many-toothed or

in other very similar species quite obsolete.—*Herpestis*, Gærtn. Fruct. iii. 186, t. 214, fig. 6; Benth. et Hook. f. Gen. Pl. ii. 951.

Species about 50, widely dispersed in all tropical regions; most numerous in America.

Plant creeping: leaves broad at the apex . . . 1. *M. cuneifolia.*
Plant not creeping; leaves narow at the apex.
  Flowers distinctly pedunculate.
    Leaves much narrowed at the base; peduncles glabrous.
      Plant 6–12 in. high; leaves up to $1\frac{1}{4}$ in. long . 2. *M. calycina.*
      Plant 1–2 ft. high; leaves $1\frac{1}{2}$–$2\frac{1}{2}$ in. long . 3. *M. decumbens.*
    Leaves broad or not much narrowed at the base; peduncles pubescent.
      Leaves ovate-lanceolate . . . . . 4. *M. pubescens.*
      Leaves linear to narrowly oblong . . . 5. *M. floribunda.*
  Flowers subsessile.
    Leaves ovate-lanceolate . . . . . 6. *M. occultans.*
    Leaves lanceolate . . . . . 7. *M. hamiltoniana.*
    Leaves linear or linear-lanceolate . . . 8. *M. punctata.*

1. **M. cuneifolia,** *Michaux, Fl. Bor. Amer.* ii. 22 (*Monniera*). A creeping herb often bearing roots at the nodes, glandular-punctate, glabrous or sometimes sparingly pubescent on the younger parts. Leaves sessile, obovate-cuneate or spathulate-oblong, 2–9 lin. long, $1\frac{1}{4}$–$3\frac{1}{2}$ lin. broad, entire or sometimes crenulate, obtuse, sometimes minutely emarginate. Flowers axillary, solitary; peduncles 2–6 lin. long, often much longer in the fruiting stage; bracts oblong, obtuse, 1–$1\frac{1}{4}$ lin. long. Calyx about 3 lin. long; posticous segment ovate, obtuse, 2–3 lin. long, $1\frac{1}{2}$–2 lin. broad; anticous segments slightly narrower; lateral oblong-lanceolate, minutely ciliate, acute. Corolla blue, 3–$3\frac{3}{4}$ lin. long, subequally 5-lobed. Capsule ovoid, 2 lin. long, glabrous.—Hiern in Dyer, Fl. Cap. iv. ii. 355. *Gratiola Monnieria*, Linn. Cent.Pl. ii. n. 120. *Monniera africana*, Pers. Syn. ii. 166. *Herpestis Monnieria*, Humb. Bonpl. & Kunth, Nov. Gen. et Sp. Pl. ii. 366; Benth. in Hook. Comp. Bot. Mag. ii. 58, and in DC. Prodr. x. 400; Hook. f. Fl. Brit. Ind. iv. 272; Bot. Mag. t. 2557 (*β portulacea*); Durand & Schinz, Études Fl. Congo, i. 209; Klotzsch in Peters, Reise Mossamb. Bot. 223. *H. crenata*, Beauv. Fl. Oware, ii. 83, t. 112. *H. africana*, Steud. Nomencl. Bot. ed. i. 402. *Bacopa Monniera*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B, 77. *B. Monnieria*, Engl. Pfl. Ost-Afr. C. 357.

Upper Guinea. Lagos: Koto, *Beauvois.*
Mozamb. Dist. Mozambique, *Kirk!* Mozambique Isle, *Peters.*
Also found in almost all warm countries.

2. **M. calycina,** *Hiern in Cat. Afr. Pl. Welw.* i. 760. A subglabrous gland-dotted branched herb, 6–12 in. high; stems and branches stout, ascending or decumbent. Leaves up to $1\frac{1}{4}$ in. long and $\frac{2}{3}$ in. broad, lanceolate to ovate, obtuse or subacute, narrowed at the base into a short broad petiole or sometimes sessile and semiamplexicaul, crenate-serrate. Flowers axillary, solitary; peduncles $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long,

winged near the calyx; bracts 2, about $\frac{3}{4}$ lin. long, setaceous. Calyx 3 lin. long to 5 lin. long in the fruiting stage; posticous segment broadly ovate, $2\frac{1}{2}$–3 lin. broad, obtuse, thin, distinctly reticulate; the 2 anticous segments similar but somewhat narrower; lateral shorter, ovate-lanceolate, acuminate, keeled, minutely ciliate on the margins and keel. Corolla white, slightly longer than the calyx; upper lip emarginate; lower lip deeply 3-lobed: lobes emarginate. Style 1 lin. long, emarginate-capitate at the apex. Capsule 2 lin. long, ellipsoid, obtuse, densely gland-dotted. Seeds ellipsoid, regularly areolate.—*Herpestis calycina*, Benth. in Hook. Comp. Bot. Mag. ii. 57, and in DC. Prodr. x. 399; Engl. in Engl. Jahrb. viii. 65. *Bacopa calycina*, Engl. in Schlechter, Westafrik. Kautsch.-Exped. 313; De Wild. & Durand in Bull. Herb. Boiss. 2me sér. i., 832; De Wild. Étud. Fl. Bas- et Moyen-Congo, i. 73.

Upper Guinea. Senegambia, *Perrottet!* Senegal, *Leprieur*, 214! Togo: near Lome, *Warnecke*, 226! Northern Nigeria: Borgu, *Barter*, 1690!

Nile Land. Bongo: Dukutu (Duggudu), *Schweinfurth*, 2837!

Lower Guinea. Lower Congo: island near Ponta da Lenha, *Naumann*; Ntamo Falls, near Stanley Pool, *Hens*, 27! Stanley Pool, *Schlechter*, 12559! between Dembo and Kisantu, *Gillet*, 1576. Angola: Ambriz, *Welwitsch*, 5918! Golungo Alto; near Calolo, *Welwitsch*, 5909! Cazengo; near Dalatanda, *Welwitsch*, 1262! Pungo Andongo, *Welwitsch*, 5875! 5877!

South Central. Congo Free State: between Leopoldville and Mombazi, *Gillet*, 2552.

Mozamb. Dist. Zanguebar, *Kirk!*

Var. *Thonningii*, Benth. in DC. Prodr. x. 399. Leaves narrower than the calyx-segments.—*H. Thonningii*, Benth. in Hook. Comp. Bot. Mag. ii. 58. *Erinus africanus*, Schumach. & Thonn. Beskr. Guin. Pl. 278? not of Linn.

Upper Guinea. Sierra Leone, *Smeathman*. Ashanti: Niugo, *Thonning*.

3. **M. decumbens,** *Skan*. A rather stout glandular-punctate herb 1–2 ft. high, erect or decumbent at the base; stem quadrangular, simple or branched, glabrous or slightly glandular-pulverulent. Leaves lanceolate or oblong-lanceolate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, subacute or obtusely acuminate, narrowed at the base, often semiamplexicaul, serrulate above the middle, glabrous, densely glandular-punctate. Flowers axillary, solitary, usually distant on the stem, often crowded at the ends of very short branches; peduncles 1–3 lin. long; bracts linear to lanceolate, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. long. Posticous calyx-segment broadly ovate, $3\frac{1}{2}$–$4\frac{1}{2}$ lin. long, 3 lin. broad, glabrous, obtuse, strongly nerved, sometimes minutely few-toothed; anticous segments somewhat narrower; lateral lanceolate or ovate-lanceolate, acuminate, minutely ciliate on the margins and keel. Corolla 4–5 lin. long, slightly 2-lipped. Capsule ovoid, $2\frac{1}{2}$–3 lin. long, glandular-pulverulent.—*Herpestis decumbens*, Fernald in Proc. Amer. Acad. xxxiii. 91.

Upper Guinea. Senegambia, *Heudelot*, 595! Gambia, *Brown-Lester*, 30! Sierra Leone: about Mahela, *Scott-Elliot*, 3847!

Also in Mexico.

I can find no valid character by which to separate the African from the Mexican plant. Scott-Elliot's specimen is labelled "very common in ricefields." It has probably been introduced into Africa.

4. **M. pubescens,** *Skan.* A rather stout apparently erect sparingly branched herb, glandular-punctate, minutely pubescent on the younger parts of the stem, on the young leaves, peduncles and calyx; stem quadrangular, ribbed in the dried state. Leaves sessile, broad at the base and semiamplexicaul, ovate-lanceolate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, entire, somewhat revolute on the margins, scarcely acute. Flowers like those of *H. calycina*, but the peduncles are densely and minutely pubescent, the calyx pubescent, with thicker and less distinctly reticulate segments.

Upper Guinea. Sierra Leone: marshy ground by the Falaba River, *Scott-Elliot*, 5451 !

5. **M. floribunba,** *T. Cooke, Fl. Pres. Bombay*, ii. 286. An erect slender branched herb 4–11 in. high, scabrid, glabrous or sparingly and minutely puberulous, glandular-punctate. Leaves sessile, linear, linear-lanceolate or narrowly oblong, $\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{3}{4}$–$2\frac{1}{2}$ lin. broad, entire, scarcely acute, narrow at the base or semiamplexicaul. Flowers axillary, usually solitary; peduncles 1–2 lin. long; bracts setaceous, $\frac{3}{4}$ lin. long. Calyx minutely puberulous and glandular-pulverulent; posticous segment ovate, $2\frac{3}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, apiculate; anticous rather narrower, acute; lateral lanceolate, acuminate, $1\frac{1}{2}$ lin. long. Corolla blue or violet, sulphur-yellow at the throat, $1\frac{3}{4}$ lin. long; upper lip emarginate; lower lip equally 3-lobed. Capsule ellipsoid, $1\frac{1}{2}$ lin. long, glabrous.—*Herpestis floribunda*, R. Br. Prodr. 442; Benth. in DC. Prodr. x. 400; Oliver in Trans. Linn. Soc. xxix. 120; Hook. f. Fl. Brit. Ind. iv. 273; Vatke in Linnæa, xliii. 307. *Bacopa floribunda*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 77; Engl. Pfl. Ost-Afr. C. 357.

Upper Guinea. Senegambia, *Perrottet !* Northern Nigeria: Nupe, *Barter*, 1011 ! Borgu, *Barter*, 785 !

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2588 ! Bongo; Gir, *Schweinfurth*, 2534 ! Uganda: Madi, *Speke & Grant !* British East Africa: Mombasa, *Bojer !*

Mozamb. Dist. Pemba Island, *Bojer !* Zanzibar, *Kirk ! Hildebrandt*, 906 !

Also in Madagascar, Tropical Asia and Australia.

6. **M. occultans,** *Hiern in Cat. Afr. Pl. Welw.* i. 760. An erect herb 3–6 in. high, branched from the base; stems quadrangular, about 1 lin. in diam., sparingly pubescent chiefly on the upper part; internodes 2–5 lin. long. Leaves ovate-lanceolate, $\frac{1}{2}$–1 in. long, 3–4 lin. broad, obtusely acuminate, semi-amplexicaul, entire or remotely denticulate near the apex, densely glandular-punctate, glabrous except for a few short hairs on the midrib. Flowers axillary, solitary or a few together; peduncles $\frac{1}{2}$ lin. long; bracts ovate, $\frac{1}{3}$–$\frac{1}{2}$ lin. long, concave. Calyx-segments glandular-punctate; posticous segment ovate, $1\frac{1}{2}$–2 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, obtuse; anticous ovate, obtuse, slightly narrower; lateral ovate-lanceolate, $1\frac{1}{4}$ lin. long, membranous, obtusely acuminate, with a single row of rather long thick hairs on the keel. Corolla white,

$1\frac{1}{2}$ lin. long; upper lip entire; lower 3-lobed. Capsule ellipsoid, 1 lin. long, glabrous.

Upper Guinea. Northern Nigeria: Nupe, margins of small lakes, *Barter*, 1689 !

Lower Guinea. Angola: Pungo Andongo; in marshes and streams from Caghuy towards Condo, Miêge stream near Lake Quibinda, and near Sansamanda, *Welwitsch*, 5891 !

7. **M. hamiltoniana,** *T. Cooke, Fl. Pres. Bombay*, ii. 286. An erect herb 6–12 in. high, glandular-punctate, glabrous or slightly pulverulent; stem simple or branched, quadrangular. Leaves sessile and semi-amplexicaul or narrowed at the base into a short petiole, lanceolate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $1\frac{1}{4}$–$3\frac{1}{2}$ lin. broad, entire or remotely and obscurely denticulate, narrowed at the apex but scarcely acute. Flowers axillary, solitary, subsessile; bracts small, setaceous. Calyx glandular-punctate, minutely pubescent; posticous segment broadly ovate, $1\frac{3}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, acute or subacute; anticous segments much smaller; lateral linear-lanceolate, $1\frac{1}{4}$ lin. long, acuminate. Corolla $1\frac{1}{4}$ lin. long; upper lip truncate, emarginate; lower lip equally 3-lobed. Capsule broadly ovoid, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, glabrous.—*Herpestis hamiltoniana*, Benth. Scroph. Ind. 30, and in DC. Prodr. x. 400; Hook. f. Fl. Brit. Ind. iv. 272. *Bacopa hamiltoniana*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 77.

Upper Guinea. Senegal, *Leprieur*, 237 !

Also in India.

8. **M. punctata,** *Skan.* An erect slender slightly pulverulent glandular-punctate herb 4–12 in. high; stem simple or sparingly branched, quadrangular. Leaves sessile, linear or linear-lanceolate, usually about 1 in. long and $1\frac{1}{4}$ lin. broad, narrowed at the apex but scarcely acute, often semi-amplexicaul, entire, somewhat scaberulous. Flowers axillary, solitary, subsessile; bracts linear, 2 lin. long, scarcely acute. Calyx glandular-pulverulent; posticous segment ovate-lanceolate, $2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad; anticous segments oblong-lanceolate, 2 lin. long, minutely ciliate; lateral minutely ciliate, lanceolate, $1\frac{3}{4}$ lin. long. Corolla 2 lin. long: upper lip emarginate; lower lip 3-lobed. Capsule ovoid-globose, 1–$1\frac{1}{4}$ lin. long, bisulcate, glabrous.—*Bacopa punctata*, Engl. in Engl. Jahrb. xxiii. 499.

Nile Land. Jur: Agada, *Schweinfurth*, 2465 ! Jur Ghattas, *Schweinfurth*, 4257 !

Imperfectly known species.

9. **Bacopa alternifolia,** *Engl. in Schlechter, Westafrik. Kautsch.-Exped.* 313. Flowers bright blue.

Lower Guinea. Lower Congo: islands of Stanley Pool, *Schlechter*, 12571. French Congo: near Bonga, *Schlechter*, 12651.

24. **DOPATRIUM**, Hamilt. ; Benth. et Hook. f. Gen. Pl. ii. 953.

Calyx small, deeply 5-fid ; lobes imbricate. Corolla-tube slender at the base, dilated at the throat ; upper outside lip short, 2-fid ; lower lip large, spreading, broadly 3-lobed. Perfect stamens 2, posticous, included ; filaments filiform ; anther-cells parallel, distinct, equal ; staminodes 2, anticous, minute. Style short, bilamellate at the apex. Ovules many. Capsule small, globose or ovoid, scarcely sulcate, loculicidal ; valves entire or more rarely 2-fid. Seeds small, tuberculate.—Slender sometimes filiform glabrous herbs. Leaves opposite, rather small and close together at the base of the stem, with minute distant ones along the stem. Flowers small or medium-sized, violet or purple, rarely all yellow, usually in terminal racemes ; pedicels ebracteate.

Species 12, the others in Asia, 1 of which extends to Australia.

Flowers all yellow . . . . . 1. *D. luteum.*
Flowers not yellow (or only with a little yellow on the lower lip).
  Pedicels less than 1 in. long.
    Lower leaves $1\frac{1}{2}$–$2\frac{1}{4}$ in. long . . . . 2. *D. tricolor.*
    Lower leaves less than 1 in. long.
      Calyx-teeth $1\frac{1}{4}$ lin. long . . . . . 3. *D. longidens.*
      Calyx-teeth $\frac{2}{3}$ lin. long or less.
        Pedicels 2–3 lin. long.
          Inflorescence a raceme.
            Corolla-limb 8–10 lin. broad . . . 4. *D. macranthum.*
            Corolla-limb about 5 lin. broad . . 5. *D. Dortmanna.*
          Inflorescence a panicle . . . . 6. *D. stachytarphetoides.*
        Pedicels 4–10 lin. long.
          Corolla sparingly pilose ; tube 3–4 lin. long 7. *D. senegalense.*
          Corolla glabrous ; tube $7\frac{1}{3}$ lin. long . . 8. *D. nanum.*
  Pedicels 2–3 in. long . . . . . 9. *D. angolense.*

1. **D. luteum,** *Engl. in Engl. Jahrb.* xxiii. 498. Stems slender, erect, simple or once branched in the upper part, $\frac{3}{4}$–1 ft. high ; internodes $1\frac{1}{4}$–4 in. long. Radical and lower cauline leaves $\frac{1}{2}$–1 in. long, 2–$3\frac{1}{4}$ lin. broad, elliptic to linear-oblong, obtuse ; upper cauline leaves scale-like, $1\frac{1}{4}$–2 lin. long, ovate to suborbicular, acute or obtuse, connate at the base. Inflorescence a terminal few-flowered raceme ; bracts similar to the cauline leaves but smaller, in pairs $1\frac{1}{2}$–3 lin. apart ; pedicels 2–$4\frac{1}{2}$ lin. long. Calyx 2 lin. long, minutely and sparingly pubescent ; teeth scarcely $\frac{1}{2}$ lin. long, broad, obtuse. Corolla bright yellow ; tube 9–10 lin. long, about 1 lin. broad ; upper lip 4 lin. long, 3 lin. broad, slightly emarginate ; lower lip tripartite ; lateral lobes 4 lin. long, 3 lin. broad ; anticous lobe 6 lin. long, 9 lin. broad, deeply emarginate. Stamens inserted just below the throat of the corolla-tube ; anthers pubescent, coherent. Style 9 lin. long. Capsule subglobose, $2\frac{1}{4}$ lin. long, 2 lin. broad.

Nile Land. Bongo : Gir, *Schweinfurth,* 2153 !

D. Schweinfurthii, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3B. 75, said to have large yellow flowers, is, I presume, the same as *D. luteum*. Engl.

2. **D. tricolor,** *Engl. in Engl. Jahrb.* xxiii. 499. Stems erect, simple, about 1½ ft. high; lower internodes short, upper 1–3 in. long. Radical leaves rather crowded, broadly linear, 1½–2¼ in. long, 1–2 lin. broad, obtuse, slightly broader at the apex; cauline leaves 1–5 lin. long, becoming scale-like and membranous, connate at the base, oblong to suborbicular. Inflorescence a short terminal raceme; bracts similar to the uppermost leaves; pedicels 2–3½ lin. long. Calyx 1½ lin. long, membranous; teeth ½ lin. long, broad, obtuse. Corolla whitish, violet on the upper lip and the lateral lobes of the lower lip, golden-yellow on the anticous lobe at the base; tube infundibuliform, about 7 lin. long; upper lip broadly obovate, 3 lin. long, 2½ lin. broad, emarginate; lateral lobes of the lower lip 4 lin. long, 2½ lin. broad; anticous lobe 5 lin. long, 4 lin. broad. Filaments twisted just below the anthers; anther-cells apiculate, minutely pubescent, with a tuft of hairs at the base. Style 1¼ lin. long.

Nile Land. Bongo: between Addai and Gir, *Schweinfurth*, 2557!

D. tricolor, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3B. 75, is apparently the same as *D. tricolor*, Engl.

3. **D. longidens,** *Skan.* Stems erect, ¾–1 ft. high, simple; internodes 1¼–2 in. high. Radical leaves oblong-lanceolate, up to ½ in. long, 1¼–2 lin. broad, acute; cauline leaves scale-like, ovate, 1½–2 lin. long, acute, connate at the base. Inflorescence a few-flowered terminal raceme; bracts similar to the upper leaves but smaller; pedicels 5–8 lin. long, minutely pubescent. Calyx 2 lin. long, minutely and sparingly pubescent; teeth 1¼ lin. long, oblong, obtuse, dark brown in the middle, hyaline along the margins, faintly 3-nerved. Corolla reddish-purple with a white spot on the lower lip (*Barter*); tube cylindric, 7 lin. long, sparingly pubescent; limb 10–11 lin. broad; upper lip entire, obovate, 3½ lin. long, 3 lin. broad; lower lip tripartite; lateral lobes obovate; anticous lobe 6–7 lin. long, 7–8 lin. broad, emarginate. Anthers coherent, ciliate; cells subequal. Style 6 lin. long. Capsule subglobose, about 3 lin. long.

Upper Guinea. Northern Nigeria: Nupe, in pools on rocks, *Barter*, 1683!

4. **D. macranthum,** *Oliv. in Trans. Linn. Soc.* xxix. 120, *t.* 121, *fig. A.* Stems erect, 8–10 in. high, sparingly branched near the base. Radical leaves oblanceolate, 4–9 lin. long; cauline leaves scale-like, 1 lin. long, ovate, obtuse, connate at the base. Inflorescence a terminal few-flowered raceme; bracts minute; pedicels 2–2½ lin. long. Calyx 1½–1¾ lin. long, minutely pubescent; teeth scarcely ½ lin. long, broad, obtuse, 3-nerved. Corolla purple or violet; tube ¾ in. long, curved but scarcely dilated at the throat; limb 8–10 lin. broad; upper lip 2-fid; lobes rounded; lower lip obtusely 3-lobed. Anther-cells subequal, ciliate; connective thickened on the back.—*D. senegalense*, T. Thoms. in Speke, Nile, Append. 641, not of Benth.

Nile Land. Uganda: near Koki or Koche in Ganiland, *Speke & Grant!*

5. **D. Dortmanna,** *S. Moore in Journ. Linn. Soc.* xxxvii. 189. Stems slender, 8 in. long, simple; internodes usually $\frac{3}{4}$–$1\frac{3}{4}$ in. long. Radical leaves sessile, oblong-ovate, about $3\frac{1}{2}$ lin. long and $1\frac{1}{2}$ lin. broad, obtuse; cauline leaves in distant pairs, ovate, only $\frac{3}{4}$ lin. long, obtuse. Flowers strictly racemose; pedicels up to 3 lin. long. Calyx campanulate, $1\frac{3}{4}$ lin. long; teeth broadly oblong, about $\frac{2}{3}$ lin. long, obtuse. Corolla dark blue; tube narrowly cylindric, 6 lin. long, rather more than $\frac{1}{2}$ lin. in diam., somewhat dilated under the limb and curved; lips broadly ovate; upper lip $1\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad; median lobe of the lower lip 3 lin. long, 2 lin. broad; lateral lobes $1\frac{1}{2}$ lin. long. Anther-cells equal, ciliate. Ovary ovoid, scarcely 1 lin. long; style 5 lin. long.

Nile Land. Uganda: South Ankole; edge of a pool at Mulema, *Bagshawe*, 315!

6. **D. stachytarphetoides,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 362. Stem erect, rather stout, $1\frac{3}{4}$ ft. high, simple up to the inflorescence; internodes $1\frac{1}{4}$–$3\frac{1}{2}$ in. long. Radical leaves about 7 lin. long, 2–3 lin. broad, oblong, acute; cauline leaves scale-like, membranous, ovate, $2\frac{1}{2}$–3 lin. long, retuse, connate at the base. Inflorescence a terminal few-branched panicle; bracts similar to the upper leaves but smaller; pedicels 2 lin. long. Calyx $1\frac{3}{4}$ lin. long, glabrous, purple chiefly on the teeth; teeth $\frac{2}{3}$ lin. long, obtusely apiculate. Corolla carmine, violet when dry, glabrous except for a few minute hairs on the throat outside; tube cylindric, 4 lin. long; limb 4–5 lin. broad; upper lip entire, elliptic, $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad; lateral lobes of the lower lip obovate, $1\frac{1}{2}$ lin. long; anticous lobe $3\frac{1}{2}$ lin. long, $3\frac{3}{4}$ lin. broad, deeply 2-lobed. Anthers free, minutely pubescent. Style $3\frac{1}{2}$ lin. long. Capsule ellipsoid, $2\frac{3}{4}$ lin. long, 4-valved, glabrous.

Lower Guinea. Angola: between the Kubango River and Kassinga, 5600 ft., *Baum*, 923!

7. **D. senegalense,** *Benth. in DC. Prodr.* x. 407. Stems slender, 6–12 in. long, simple or sparingly branched above. Radical leaves few, obovate, 4–5 lin. long, 2–3 lin. broad; cauline leaves scale-like, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, ovate, acute, connate at the base, erect. Flowers in short terminal racemes; bracts minute, spreading, in pairs $1\frac{1}{2}$–$2\frac{1}{2}$ lin. apart; pedicels capillary, 4–8 lin. long. Calyx membranous, 1–$1\frac{1}{4}$ lin. long; teeth $\frac{1}{2}$ lin. long, 3-nerved, acute. Corolla sparingly pilose outside; tube infundibuliform, 3–4 lin. long. Filaments twisted just below the anthers; anthers coherent; cells apiculate, ciliate. Style $1\frac{1}{2}$ lin. long. Capsule subglobose, $1\frac{1}{2}$ lin. long.

Upper Guinea. Senegambia, *Heudelot*, 138! 743! North-eastern part of Sierra Leone, *Garrett!*

8. **D. nanum,** *Scott-Elliot in Journ. Linn. Soc.* xxx. 94. Stem filiform, 4–8 in. high, glabrous and glaucous, simple or once or twice branched towards the apex. Radical leaves wanting in the specimen seen; cauline leaves 1 lin. long, ovate, subacute, subcordate at the base.

Pedicels 10 lin. long. Sepals membranous, $1\frac{1}{2}$ lin. long, obtusely apiculate, obscurely 3-nerved. Corolla-tube $7\frac{1}{2}$ lin. long, 1–$1\frac{1}{2}$ lin. broad, glabrous, cylindric, purple. Filaments 1–$1\frac{1}{2}$ lin. long, inserted below the middle of the corolla-tube; anthers oblong. Style about $1\frac{1}{2}$ lin. long; stigma broadly bilamellate. Capsule 2 lin. long, $1\frac{1}{2}$ lin. broad, obscurely punctate.

Upper Guinea. Sierra Leone: Buyabuya (Bayabaya), on the Scarcies River, 700 ft., *Scott-Elliot*, 4275!

9. **D. angolense,** *Skan.* Stems rather stout, 5–6 in. long, once branched. Radical leaves 5–7 lin. long, about 1 lin. broad, linear-oblong, acute; cauline leaves scale-like, membranous, $2\frac{1}{2}$–3 lin. long, ovate, acute, connate at the base. Flowers axillary, solitary; pedicels 2–3 in. long, rather stout. Calyx membranous, $3\frac{1}{2}$ lin. long, glabrous; teeth 1–$1\frac{1}{4}$ lin. long, obtuse. Corolla blue with yellow on the base of the lower lip; tube $4\frac{1}{2}$ lin. long, subinfundibuliform; limb (imperfect) 10 lin. broad; lobes rather coarsely dentate. Style 2 lin. long. Anthers coherent, ciliate.

Lower Guinea. Angola: very common in the Rio Palanca, *Newton!*

25. ARTANEMA, Don; Benth. et Hook. f. Gen. Pl. ii. 953.

Calyx 5-partite; segments herbaceous, acuminate, broad at the base, very much imbricated. Corolla-tube elongated, broad; upper outside lip erect, broad, emarginate; lower spreading, 3-fid. Perfect stamens 4, didynamous; posticous pair included; filaments short, filiform; anticous pair affixed below the throat; filaments long, arched, with a broad appendage at the base of each, connivent at the apex under the upper lip; anthers approximate or coherent in pairs; cells confluent at the apex. Style bilamellate at the apex. Ovules numerous. Capsule globose, septicidal; valves entire, submembranous. Seeds foveolate-rugose.—Erect herbs scabrid on the angles of the stem and on the upper side of the leaves. Leaves opposite, quite entire or serrate. Flowers rather large in terminal bracteate racemose inflorescences; pedicels ebracteolate.

Species 4, the others in Tropical Asia and Australia.

1. **A. sesamoides,** *Benth. Scroph. Ind.* 39. A stout erect sparingly branched herb $1\frac{1}{2}$–3 ft. high, somewhat scabrid on the angles of the stem and on the leaves; stem quadrangular. Leaves 2–5 in. long, $\frac{1}{2}$–$1\frac{1}{2}$ in. broad, lanceolate or oblong-lanceolate, more or less serrate, acute or acuminate, petiolate or the upper sometimes subsessile. Raceme 2–5 in. long; bracts 2–5 lin. long, ovate to lanceolate, acute or acuminate; pedicels 2–5 lin. long. Calyx $3\frac{3}{4}$–$4\frac{1}{2}$ lin. long, usually minutely and scabridly hairy. Corolla lilac-violet or dark purple, 10–14 lin. long, minutely pubescent. Anthers coherent in pairs. Capsule globose, about 5 lin. in diam.—DC. Prodr. x. 408; Hook. f. Fl. Brit. Ind. iv. 274; De Wild. & Durand, Contrib. Fl.

Congo, i. fasc. 2, 45, and Reliq. Dewevr. 169; De Wild. Études Fl. Bas- et Moyen-Congo, i. 73. *A. longifolium*, Vatke in Linnæa, xliii. 307 (var.); Engl. Pfl. Ost-Afr. C. 357, and in Schlechter, Westafrik. Kautsch.-Exped. 313. *A. longiflorum*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 79. *Columnea longifolia*, Linn. Mant. 90. *Achimenes sesamoides*, Vahl, Symb. Bot. ii. 71; Schumach. & Thonn. Beskr. Guin. Pl. 281. *Diceros longifolius*, Pers. Syn. ii. 164.

Upper Guinea. Guinea: near Dudun, *Thonning*. Ashanti: Sutah, *Cummins*, 53! 60! Gold Coast: Accra, *Brown*, 381! Togo, *Baumann*, 245 Lagos: Ebute Metta, *Millen*, 4! near Lagos, *Moloney!* Abeokuta, *Irving!* Yoruba, *Millson*, 72! near Ishagamo, *Schlechter*, 13009. Southern Nigeria: Ndoni, *Barter*, 1769! Cameroons, *Braun!* Yaunde, *Zenker & Staudt*, 507!

South Central. Congo Free State: Upper Congo; near Bumba, *Dewèvre*, 896; near Stanley Falls, *Demeuse*; between Leopoldville and Mombazi, *Gillet*, 2622.

Barter states that his specimen had deep crimson flowers. In other respects it is identical with *A. sesamoides*.

The native name in Lagos is "Sokoyokoto." Its leaves are used as a vegetable by the natives.—*Millen*.

Also in Tropical Asia.

Var. *amplexicaule*, Skan. Leaves dilated at the base, amplexicaul or semi-amplexicaul.—*A. longifolium*, Vatke, var.? *amplexicaule*, Vatke in Linnæa, xliii. 307.

Nile Land. British East Africa: near Mombasa, *Hildebrandt*, 2001 B! Fimbine, near Rabai, *Hildebrandt*, 2312! near Gadu, 300 ft., *Kässner*, 412!

A. Cabræ, De Wild. & Durand in Comptes-rendus Soc. Bot. Belg. xxxviii. 131, from the Lower Congo, I have not seen. It does not appear from the description to be distinct from *A. sesamoides*, but the authors state that *A. Cabræ* differs in having herbaceous instead of hard and coriaceous stems and leaves, larger leaves with fewer and more distant teeth, and shorter bracts.

26. **CRATEROSTIGMA**, Hochst.; Benth. et Hook. f. Gen. Pl. ii. 954.

Calyx tubular, 5-costate, plicate; teeth 5, narrow, subequal. Corolla-tube enlarged above; upper outside lip erect, concave, entire or emarginate; lower lip larger, spreading, 3-lobed; lobes broad, subequal. Perfect stamens 4; posticous pair subincluded in the tube; filaments filiform; anticous pair affixed to the throat of the corolla; filaments elongated, arched, connivent under the upper lip, gibbous and appendiculate at the base; anthers approximate or coherent in pairs; cells divaricate, distinct. Style filiform, subinfundibuliform, dilated and very shortly bilamellate at the apex; ovules numerous. Capsule oblong, included in the calyx, septicidal; valves thin, entire.—Dwarf perennial herbs acaulescent or sometimes with elongated sparingly leafy stems. Leaves when radical resembling those of *Plantago*, usually quite entire. Flowers at the apex of a scape shorter or somewhat longer than the leaves, few in the axils of opposite bracts, or crowded in small terminal subcapitate spikes, more rarely solitary.

Species 12, all African, 1 extending to Arabia.

Acaulescent.
Scape very short or wanting . . . . . 2. *C. pumilum.*
Scape rather shorter to somewhat longer than the leaves; inflorescence not capitate.
Leaves not more than 3 times as long as broad.
Inflorescence a corymbose raceme . . . 1. *C. plantagineum.*
Inflorescence a spike-like raceme.
Nerves of the leaves persistent . . . 3. *C. hirsutum.*
Nerves of the leaves not persistent.
Flowers subsessile; calyx $2\frac{1}{4}$ lin. long . 4. *C. Smithii.*
Pedicels $1\frac{1}{2}$ lin. long; calyx $3\frac{3}{4}$–4 lin. long 5. *C. nanum.*
Leaves more than 4 times as long as broad.
Leaves lanceolate . . . . . 6. *C. lanceolatum.*
Leaves linear . . . . . 7. *C. linearifolium.*
Scape 3 or 4 times as long as the leaves; inflorescence capitate . . . . . 10. *C. Welwitschii.*
Caulescent.
Flowers crowded in capitate or subcapitate inflorescences.
Bracts broad, longer than the calyx.
Plant 4–6 in. high; branches rather densely leafy 11. *C. crassifolium.*
Plant 18 in. high or more; branches very sparingly leafy. . . . . 12. *C. latibracteatum.*
Bracts narrow, shorter than the calyx . . . 9. *C. Schweinfurthii.*
Flowers more or less distant in a spike-like raceme . 8. *C. Gœtzei.*

1. **C. plantagineum,** *Hochst. in Flora*, 1841, 669. A densely pilose acaulescent perennial herb with a short thick rhizome densely covered with stout roots. Leaves rosulate, ovate, ovate-subcordate or rarely lanceolate, $\frac{3}{4}$–3 in. long, 5 lin. to $2\frac{3}{4}$ in. broad, broadly obtuse to subacute, narrowed at the base into a short broad petiole, 5–9-nerved, ciliate, usually densely pilose beneath, glabrous or sometimes sparingly pilose above. Scape $\frac{3}{4}$–$1\frac{3}{4}$ in. long, quadrangular. Inflorescence a raceme, sometimes with the pedicels very short or sometimes with the lower pedicels up to $1\frac{1}{4}$ in. long, forming a corymb; bracts opposite, lanceolate, 3–6 lin. long. Calyx $2\frac{3}{4}$–$3\frac{1}{2}$ lin. long, more or less pubescent outside; teeth $\frac{1}{2}$–1 lin. long, acute. Corolla yellow and white, or yellow, white and purple, or blue, 5–7 lin. long; upper lip $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long; lower lip $3\frac{1}{2}$ lin. long, $4\frac{1}{4}$–5 lin. broad. Capsule ovoid-oblong, glabrous, slightly shorter than the calyx.—Vatke in Linnæa, xliii. 307; Rolfe in Oates, Matabeleland, ed. 2, 405; Engl. Pfl. Ost-Afr. C. 357; Hiern in Cat. Afr. Pl. Welw. i. 761, and in Dyer, Fl. Cap. iv. ii. 361; S. Moore in Journ. Bot. 1900, 467, and in Journ. Linn. Soc. xxxvii. 190; Almagià in Ann. Istit. Bot. Roma, viii. 140. *Torenia plantaginea*, Benth. in DC. Prodr. x. 411, excl. syn. *Dunalia acaulis*, R. Br.; A. Rich. Tent. Fl. Abyss. ii. 121; Oliver in Trans. Linn. Soc. xxix. 120; Schweinf. Beitr. Fl. Aethiop. 101; Vatke in Oest. Bot. Zeitschr. 1875, 10; Martelli, Fl. Bogos. 63. *T. pumila*, T. Thoms. in Speke, Nile, Append. 641, not of Benth.

Nile Land. Eritrea: various localities; *Terracciano, Pappi, & Ragazzi, Hildebrandt*, 642, *Schweinfurth & Riva*, 1380! *Beccari*, 144! *Steudner*, 779!

Abyssinia: Tigre; Mount Scholoda, *Schimper*, 310! Shoa, *Quartin-Dillon!* Dathura (Dat Hara), *Roth*, 461! Somaliland: Darra-as, *Mrs. Lort Phillips!* Boobi and Hahi, *James & Thrupp!* Uganda: Buddu, 4100 ft., *Brown*, 126! British East Africa: Kapte Plains, *Gregory*, 30! Ukamba, *Scott-Elliot*, 6525! 6710! *Hildebrandt*, 2750! Machakos, *Hinde!* Mbuyuni, *Scott-Elliot*, 6194! Taro, 1500 ft., *Kässner*, 511!

Lower Guinea. Angola: Huilla, *Welwitsch*, 5785! 5786!

Mozamb. Dist. German East Africa: Karagwe, 4300–5500 ft., *Speke & Grant*, 212! near the Rufua River, *Bagshawe*, 519. British Central Africa: Nyasaland; Zomba, *Cameron*, 73 partly! Matabeleland; Iron-mine Hill, *Hon. Mrs Evelyn Cecil*, 93! Buluwayo, *Rand*, 157! and without precise locality, *Oates!* South African Gold Fields, *Baines!*

Also in Arabia, and in extra-tropical Transvaal.

The leaves and inflorescences vary considerably. The former in Scott-Elliot, 6194, and Cameron, 73, are elongate-lanceolate.

2. **C. pumilum,** *Hochst. in Flora*, 1841, 670. A small pubescent stemless perennial with a thick rootstock. Leaves in a rosette 2–2½ in. in diam., broadly ovate, 10–12 lin. long, 7–8 lin. broad, obtuse or subacute, ciliate, pubescent beneath, nearly glabrous above, narrowed at the base into a short broad petiole. Scape very short or wanting; bracts 4½ lin. long, oblong-lanceolate, obtusely acuminate; pedicels ½–1¼ lin. long. Calyx 3½ lin. long; teeth 1 lin. long, scarcely acute. Corolla 6–8 lin. long, blue and white with yellow at the throat; upper lip entire, 3–4 lin. long; lower lip 4½–5½ lin. long, 5–6½ lin. broad. Anthers glabrous.—Vatke in Linnæa, xliii. 307; Engl. Pfl. Ost-Afr. C. 357. *C. auriculæfolium*, Benth. & Hook. f. ex Vatke in Linnæa, xliii. 308. *Dunalia acaulis*, R.Br. in Salt, Abyss. Append. 64. *Torenia pumila*, Benth. in DC. Prodr. x. 411; A. Rich. Tent. Fl. Abyss. ii. 121; Schweinf. in Höhnel, Lakes Rudolf & Stephanie, ii. 357. *T. auriculæfolia*, Dombrain, Flor. Mag. x. t. 534.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 986! Ankober, *Roth*, 474! and without precise locality, *Salt!* Somaliland: Serrut Mountains, near Maid, 5900 ft., *Hildebrandt*, 1563! Wagga Mountains, *Mrs. Lort Phillips!* British East Africa: Kikuyu, *Jackson!* Mount Kenia, 6500–8000 ft., *Teleki.*

Mozamb. Dist. German East Africa: Kilimanjaro, 6500 ft., *Teleki.* Marangu, 7400 ft., *Volkens*, 909!

3. **C. hirsutum,** *S. Moore in Journ. Bot.* 1900, 461. A small acaulescent herb bearing numerous slender fibres (presistent nerves of the leaves) at the base, pilose-hirsute on both sides of the leaves, on the scape, underside of the bracts, pedicels and calyx. Leaves rosulate, oblong-spathulate, 7½ lin. long, about 5 lin. broad, membranous, rather obtuse, entire, 5-nerved. Scape ascending, slender, 1½–2 in. long; bracts ovate or ovate-lanceolate, 2½–3½ lin. long, acute, glabrous above; pedicels 2¼ lin. long. Calyx turbinate, 3 lin. long; tube 1 lin. in diam. in the upper part; lobes lanceolate, 1 lin. long, acute. Corolla glabrous; tube infundibuliform, 3½ lin. long; upper lip oblong, 3½ lin. long, emarginate, slightly undulate on the margin; lobes of lower lip

subequal, $1\frac{1}{4}$ lin. long, crisply undulate. Anthers approximate in pairs. Ovary ovoid-oblong, acute.

Nile Land. British East Africa: Kapte Plains, *Gregory!*

4. **C. Smithii,** *S. Moore in Journ. Bot.* 1900, 461. An acaulescent herb with fibrous roots. Leaves ovate or oblanceolate-oblong, up to $7\frac{1}{2}$ lin. long and $6\frac{1}{2}$ lin. broad, very obtuse, narrowed at the base into a petiole up to 5 lin. long, rarely subsessile, firmly membranous, glabrous above, adpressed-pubescent beneath. Scape slender, simple, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, white-pilose, 3- or 4-flowered; flowers nearly quite sessile; bracts 3 lin. long, scarcely as broad, ciliate, closely applied to the flowers. Calyx $2\frac{1}{4}$ lin. long, subturbinate, rather pilose; lobes deltoid, $\frac{3}{4}$ lin. long, $\frac{1}{2}$ lin. broad at the base, white-ciliate. Corolla blue; tube infundibuliform, 4 lin. long; upper lip oblong-ovate, $2\frac{1}{2}$ lin. long, 2 lin. broad, somewhat emarginate; lobes of the lower lip $1\frac{3}{4}$–2 lin. broad. Anthers approximate in pairs. Ovary ovoid, compressed.

Nile Land. Somaliland: Jara, *Donaldson-Smith!*

5. **C. nanum,** *Oliver in Hook. Ic. Pl.* xv. 63, *t.* 1479 (*var. elatior*). A small more or less pilose acaulescent herb. Leaves ovate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $3\frac{1}{2}$–5 lin. broad, entire, obtuse, narrowed at the base into a short broad petiole, pilose on both sides or subglabrous on the upper side. Inflorescence a spike-like raceme, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, on a scape somewhat longer than the leaves; bracts ovate, 4–6 lin. long, concave on the inside, obtuse or subacute, sometimes purple-tipped; pedicels about $1\frac{1}{2}$ lin. long. Calyx $3\frac{3}{4}$–4 lin. long, sparingly or rather densely hispidly hairy outside, sometimes with a few hispid hairs on the teeth inside; teeth 1 lin. long, broad, obtuse or subacute, sometimes purple-tipped. Corolla glabrous, white and purplish (*Cecil*); tube $3\frac{3}{4}$–$4\frac{1}{4}$ lin. long; upper lip $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, 2 lin. broad, denticulate; lower lip $2\frac{1}{4}$–$3\frac{1}{4}$ lin. long, 4–6 lin. broad; lobes denticulate.—Hiern in Dyer, Fl. Cap. iv. ii. 360. *Torenia nana*, Benth. in DC. Prodr. x. 412. *Uvedalia ? nana*, E. Meyer ex Drège, Zwei Pflanzengeogr. Documente. 151, 228.

Mozamb. Dist. British Central Africa: Rhodesia; Manika, Inyanga Mountains, 6000–7000 ft., *Cecil*, 208 *!*

Also in South Africa.

6. **C. lanceolatum,** *Skan.* A rather densely pilose acaulescent herb $2\frac{1}{2}$–$4\frac{1}{2}$ in. high. Leaves lanceolate, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $3\frac{1}{2}$–6 lin. broad, narrowed at the apex and base, obtuse, quite entire, 3–5-nerved; cauline leaves few, opposite, shorter than the radical leaves. Flowers racemose at the ends of the stem and short lateral branches; bracts ovate, somewhat narrowed at the apex or obtusely acuminate, up to 1 in. long and $\frac{1}{2}$ in. broad; pedicels 1–$1\frac{3}{4}$ lin. long. Calyx $3\frac{1}{2}$–4 lin. long, rather hispidly hairy; teeth 1–$1\frac{1}{4}$ lin. long, oblong or broad at the base and subsetaceous above. Corolla glabrous; tube 3–$3\frac{1}{2}$ lin. long; upper lip suborbicular, 2 lin. long, denticulate; lower lip $2\frac{1}{4}$ lin. long, $3\frac{1}{2}$ lin. broad, denticulate.—*C. nanum*, var. *lanceolatum*, Engl. Pfl. Ost-Afr. C. 357.

Mozamb. Dist. British Central Africa: Nyasaland; wet rock on the top of Mount Zomba, *Buchanan*, 246! and without precise locality, *Buchanan*, 796!

7. **C. linearifolium,** *Engl. in Engl. Jahrb.* xxiii. 501, *t.* 8, *figs. G—L.* A small glabrous cæspitose herb 1–2 in. high. Leaves all radical, linear, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, rather thick, obtuse. Scape $\frac{3}{4}$–$1\frac{1}{2}$ in. long, slender, quadrangular; flowers in a small terminal corymbose raceme; bracts linear-lanceolate to lanceolate, 2–$2\frac{3}{4}$ lin. long; pedicels up to $2\frac{1}{2}$ lin. long. Calyx about $1\frac{1}{2}$ lin. long; teeth semi-ovate, obtuse, $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Corolla whitish-violet on the tube and often on the upper lip, purple on the lower lip; tube 1–$1\frac{1}{2}$ lin. long; lobes $1\frac{1}{4}$ lin. long, denticulate.—Hiern in Cat. Afr. Pl. Welw. i. 762.

Lower Guinea. Angola: Huilla; elevated places at Nene, *Welwitsch*, 5782!

8. **C. Gœtzei,** *Engl. in Engl. Jahrb.* xxviii. 477. A perennial herb branched from the base; stems 6–14 in. long, few, ascending, quadrangular, quite glabrous; lower internodes short, the others elongated. Leaves sessile, pellucid-punctate, the lower ovate, rather obtuse, about 5 lin. long and 4 lin. broad, 3–5-nerved, the upper ovate to oblong, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad. Flowers 3–7, more or less distant in a spike-like raceme; bracts $1\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. broad, elongate-triangular, acute; pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long. Calyx 3 lin. long, purple on the winged angles; teeth triangular, $\frac{1}{2}$–1 lin. long, acute, minutely ciliate. Corolla blue or violet, yellow on the tube and on the throat inside, sparsely and shortly pilose or minutely scaberulous outside; tube $3\frac{1}{2}$ lin. long, 1 lin. broad; upper lip broadly ovate, about $1\frac{1}{2}$ lin. long, shortly bilobed; lower lip densely covered with brown hairs at the base; lobes $2\frac{1}{2}$–3 lin. long, 2 lin. broad, obovate. Appendages to the anticous filaments subclavate, about 1 lin. long. Capsule ovoid, acute, $2\frac{1}{2}$ lin. long, $1\frac{3}{4}$ lin. in diam.; seeds ovoid, brown, longitudinally sulcate and minutely tuberculate.

Mozamb. Dist. German East Africa: Uhehe; Uchungwe Mountain, near Kissinga, 6560 ft., *Goetze*, 581; Lower plateau, north of Lake Nyasa, *Thomson!*

9. **C. Schweinfurthii,** *Engl. in Engl. Jahrb.* xxiii. 501. An erect perennial 6–18 in. high; stems quadrangular, simple or sparingly branched, glabrous or sparingly pilose at the base. Leaves opposite, 3-nerved, glabrous or minutely ciliate, entire or with a few small teeth, the lower approximate, elliptic, obtuse, 9–10 lin. long, 3–5 lin. broad, the upper distant, becoming gradually smaller, elliptic-lanceolate, acute. Inflorescence terminal, subcapitate; bracts subulate, shorter than the flowers, minutely ciliate; pedicels very short. Calyx $2\frac{1}{2}$ lin. long, 5-angled or 5-ribbed; teeth 1 lin. long, setaceous above, minutely ciliate. Corolla violet, puberulous outside; tube 3 lin. long; upper lip slightly emarginate, $2\frac{1}{4}$ lin. long, 2 lin. broad, suborbicular, lower lip 4 lin. long, 5 lin. broad, with a few clavate hairs on the palate. Appendages of the anticous stamens short, capitate at the apex; anthers glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 762; Engl. & Gilg

in Warb. Kunene-Samb. Exped. 363. *Torenia Schweinfurthii*, Oliver in Hook. Ic. Pl. t. 1251.

Upper Guinea. Northern Nigeria: Nupe, *Barter!*

Nile Land. Bongo: by the River Lesi, *Schweinfurth*, 4009!

Lower Guinea. Angola: Pungo Andongo, *Welwitsch*, 5887! 5888. By the River Chitanda below Goudkopje, 3600 ft., *Baum*, 140! Malange, *Gossweiler*, 1090! 1093! *Teuscz*, 297.

10. **C. Welwitschii,** *Engl. in Engl. Jahrb.* xxiii. 501. Closely allied to *C. Schweinfurthii*, but the plant is scarcely 6 in. high, and the leaves, except 1–3 pairs of small upper ones, are in a crowded rosette at the base. Inflorescence and flowers as in that species.—Hiern in Cat. Afr. Pl. Welw. i. 762.

Lower Guinea. Angola: Huilla; in damp pastures and frequently in neglected flooded fields, *Welwitsch*, 5775!

11. **C. crassifolium,** *Engl. in Engl. Jahrb.* xxiii. 500, *t.* 8, *figs. A—F.* A sparingly pubescent perennial 4–6 in. high; stem rather stout and woody, more or less branched; branches ascending, woody at the base and sometimes root-bearing. Leaves opposite, crowded or distant, oblong-lanceolate, 3–6 lin. long, about 1½ lin. broad, obtuse, entire or slightly toothed. Inflorescence terminal, subcapitate; peduncles slender, 1–2 in. long; bracts ovate or obovate, slightly longer than the calyx, rather obtuse, sometimes faintly toothed at the apex; flowers sessile. Calyx 2½ lin. long, pilose outside, 5-angled, membranous between the angles; teeth ¾ lin. long, pale green and thickened in the middle and at the tips. Corolla white with purple stripes on the lips, minutely puberulous outside; tube 2 lin. long; upper lip 1½ lin. long, ciliate; lower lip 1½ lin. long, about 2¼ lin. broad; lobes denticulate.—Hiern in Cat. Afr. Pl. Welw. i. 761.

Lower Guinea. Angola: Pungo Andongo; in the Præsidium at Santo Antonio, *Welwitsch*, 5869! between Candumba and Lombe, and between Bumba and the cataract of the River Cuanza near Condo, *Welwitsch*, 5870! Huilla; various localities, *Welwitsch*, 5790! 5791! 5792! 5794! *Antunes*, 193. Humpata, *Newton*, 166.

12. **C. latibracteatum,** *Skan.* An erect herb up to 18 in. high or more; stems quadrangular, furrowed, branched, slender, rather densely pilose at the base, glabrescent above; branches very slender, erect or ascending, up to 1 ft. long or more, very sparingly leafy; internodes 1¼–4 in. long. Leaves opposite, sessile; lower leaves elliptic or oblong, about 6 lin. long and 3–4 lin. broad, entire, subcoriaceous, obtuse, glabrous or sparingly ciliate on the margins at the base and on the underside of the midrib; upper leaves lanceolate or linear, 3–7 lin. long, ⅓–1 lin. broad, becoming smaller from below upwards. Inflorescence terminal, capitate, on a slender peduncle 1–4 in. long; flowers 2–5, sessile; bracts suborbicular to ovate, up to 3½ lin. long and 3 lin. broad, acute or obtuse and rounded, coriaceous, ciliate. Calyx almost campanulate, 2½ lin. long, 1¾ lin. broad at the top, covered with long

whitish very slender hairs; teeth about ½ lin. long, very broad, abruptly acute, fimbriate. Corolla puberulous outside, 7–8 lin. long; tube about 4½ lin. long, ¾ lin. broad; upper lip 3 lin. long, 1½ lin. broad, oblong; lower lip about 4 lin. long, 3-lobed. Appendages of the anticous stamens ⅓ lin. long, capitate at the apex; anthers glabrous, cohering in pairs. Capsules ovoid, 2½ lin. long, 1½ lin. broad at the base, acute. —*Lindernia latibracteata*, Engl. in Schlechter, Westafr. Kautsch.-Exped. 313, without description.

Lower Guinea. Lower Congo: in marshy places around Dolo, near Stanley Pool, *Schlechter*, 12440!

27. **TORENIA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 954.

Calyx tubular, plicate or 3–5-winged, oblique at the apex, 3–5-toothed or 2-lipped. Corolla-tube cylindric or usually enlarged above; upper outside lip erect, broad, concave, emarginate or 2-fid; lower lip larger, spreading, 3-lobed; lobes broad, subequal. Perfect stamens 4; posticous pair included; filaments filiform; anticous pair affixed to the throat of the corolla; filaments elongated, arched, connivent under the upper lip, each furnished at the base with a filiform or tooth-like appendage; anthers closely approximate or coherent in pairs; cells usually confluent at the apex. Style subbilamellate at the apex. Capsule oblong, not longer than the calyx, septicidal; valves thin, entire. Seeds many, foveolate-rugose.—Glabrous, pubescent or hirsute herbs. Leaves opposite, entire or toothed. Racemes short, few-flowered, fascicle-like or more rarely elongated, terminal or pseudo-axillary; pedicels ebracteolate.

Species about 25, mostly in Tropical Asia, Madagascar, and 1 in Tropical America.

Leaves sessile.	
Pedicels scarcely ½ lin. long	1. *T. spicata.*
Pedicels 3–6 lin. long	2. *T. angolensis.*
Leaves petiolate	
Petiole 1–2 lin. long; corolla 3½–4½ lin. long . .	3. *T. parviflora.*
Petiole 4–7 lin. long; corolla about 8 lin. long . .	4. *T. Mannii.*

1. **T. spicata,** *Engl. in Engl. Jahrb.* xxiii. 502, *t.* 7, *figs. G—M.* A slender erect glabrous annual herb, 2–4 in. high; stem quadrangular, narrowly 4-winged, simple or branched. Leaves sessile, those of the lower pairs equal or subequal, those of the upper often very unequal, lanceolate, up to 9 lin. long, ½–2¾ lin. broad, obtuse or acute, minutely and remotely serrulate or entire. Lower flowers axillary, the upper in a spike-like raceme; bracts opposite very small, broad at the base with subulate tips or one of each pair leaf-like; pedicels scarcely ½ lin. long. Calyx 2 lin. long, deeply 2-lipped, 5-winged; upper lip 3-toothed; lower lip 2-toothed; teeth very small, acute. Corolla rose-coloured, blue or whitish, 2 lin. long; lobes broad, rounded. Anticous stamens with a short yellow obtuse appendage at the base of each filament.

Capsule oblong-ovoid, acute, 1½–2¼ lin. long.—Hiern in Dyer, Fl. Cap. iv. ii. 362. *T. inæqualifolia*, Engl. in Engl. Jahrb. xxiii. 502; Hiern in Cat. Afr. Pl. Welw. i. 762. *Canscora ramosissima*, Baker in Kew Bulletin, 1898, 158.

Nile Land. Jur: between Jur Ewet and Abu Guruns Seriba. *Schweinfurth.* 4296!

Lower Guinea. Angola: Humpata plateau, near Empalanca, and near Humpata and Lopollo, *Welwitsch*, 5783! and fruit, *Welwitsch*, 811. Humpata, *Johnston!*

Mozamb. Dist. British Central Africa: North Nyasaland; Fort Hill, 3500–4000 ft., *Whyte!* Transvaal; Manaka, 2700 ft., *Schlechter*, 4641!

In Engl. Jahrb. xxviii. 478, Dr. Engler described a variety from German East Africa, which he called *uhehensis* (Uhehe; near Mahenera, *Goetze*, 711). There is nothing in the description, except the purple teeth of the calyx, by which I can distinguish it from the type.

T. affinis, De Wild. Études Fl. Katanga, 122, appears to be very closely allied to, if not the same as, *T. spicata*. I have seen no specimen, and the description furnishes no distinguishing character.

2. **T. angolensis,** *Skan.* An erect branched pubescent perennial herb 2½–6 in. high; stem quadrangular; internodes up to 7 lin. long, sometimes very short. Leaves opposite, sessile, elliptic or sometimes ovate, 5–7 lin. long, 2½–4 lin. broad, obtuse or subacute, sometimes rather abruptly narrowed near the apex, semi-amplexicaul, 3-nerved, pellucid-punctate, glabrous above, minutely ciliate, sprinkled with short adpressed hairs below, serrulate, rather thick. Flowers solitary in the axils of all the upper leaves; pedicels 3–6 lin. long. Calyx 2¾ lin. long, rather densely pubescent, 2-lipped; upper lip longer, very shortly 3-toothed, with 3 broad rounded wings; lower lip shortly 2-toothed, with 2 very small wings. Corolla about 4 lin. long, mauve and white (*Monteiro*); upper lip entire, oblong, 1½ lin. long; lobes of the lower lip subelliptic, 1¼ lin. long, 1 lin. broad. Anticous filaments broadly dilated at the base. Capsule 3 lin. long, ellipsoid, acute. Seeds subglobose, foveolate.

Lower Guinea. Angola: road to Bemba, 15 miles from Ambriz, in little cracks on a large expanse of bare gneiss rock, *Mrs. Monteiro!*

3. **T. parviflora,** *Buch.-Ham. in Wall. Cat. No.* 3958. A slender straggling more or less pilose or sometimes almost glabrous herb; stems simple or branched, a few inches to 1½ ft. long, sometimes rooting at the lower nodes. Leaves ovate to ovate-lanceolate, 7–12 lin. long, 3–8 lin. broad, acute, rounded, truncate or somewhat cuneate at the base, serrate-crenate; petiole 1–2 lin. long. Flowers solitary or 2–6 together on abbreviated branches, forming a fascicle; bracts very small, setaceous; peduncles 3–12 lin. long. Calyx 3½–4 lin. long, 2-lipped, narrowly 5-winged, subglabrous to rather densely pubescent; teeth acuminate, ¾ lin. long. Corolla white, white and blue, lilac, or purple, 3½–4½ lin. long. Anticous filaments with a small tooth-like appendage. Capsule oblong, 3–3¾ lin. long, acute.—Benth. in DC. Prodr. x. 410; Hook. f.

Fl. Brit. Ind. iv. 278; Engl. in Engl. Jahrb. viii. 65; Engl. Pfl. Ost-Afr. C. 357; and in Schlechter, Westafr. Kautsch.-Exped. 313 (*Torrenia*); Hiern in Cat. Afr. Pl. Welw. i. 762; De Wild. & Durand, Reliq. Dewevr. 170. *T. ramosissima*, Vatke in Oest. Bot. Zeitschr. 1875, 10. *Lindernia senegalensis*, Hiern in Cat. Afr. Pl. Welw. i. 763.

Upper Guinea. Senegal, *Perrottet*, 587! 605; 606! Sierra Leone: Samu Country, near Tombia, *Scott-Elliot*, 4215! Niger Territory: from the sea to Nupe, *Barter*, 1199! Lagos: between Ibadan and Abeokuta, *Schlechter*, 12339! Cameroons: Batanga, *Bates*, 121! near Lobe, *Bates*, 42! Fernando Po, *Mann*, 1442!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 1463! British East Africa: Shimoni, south of Mombasa, *Whyte!*

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 338! Lower Congo: Boma, *Dewèvre*. Island near Ponta da Lenha, *Naumann*. Stanley Pool, *Hens*, 89! 301! Angola: Ambaca; between Pamba and Puri-Cacarambola, *Welwitsch*, 5913! near Ambriz, *Welwitsch*, 5917! Cazengo; at Dalatanda, *Welwitsch*, 5910! Pungo Andongo, *Welwitsch*, 5876!

South Central. Congo Free State: Monbuttu; near Munza, *Schweinfurth*, 3479!

Mozamb. Dist. Zanzibar: *Kirk! Hildebrandt*, 986! German East Africa: Zanguebar, *Kirk*, 8! Usambara; Tanga, *Volkens*, 21! Portuguese East Africa: Zambesi Delta; Kongone River, *Kirk!* Chiloane, *Scott!* British Central Africa: Nyasaland; Umbaka River, north of Lake Nyasa, *Scott!* River Shire; Elephant Marsh, *Scott!*

Also in Madagascar, Tropical Asia and America.

Var. *brevipedicellata*, De Wild. Études Fl. Bas- et Moyen-Congo, i. 73. Plant regularly dichotomously branched. Leaves rather shortly petiolate, broadly elliptic, 6 lin. long, 5 lin. broad, almost entire, acute, rounded or subobtuse at the base. Pedicels slender, 1½–2 lin. long. Calyx 4–4½ lin. long in fruit. Corolla unknown.

South Central. Congo Free State: between Léopoldville and Mombazi (Mbasi), *Gillet*, 2554.

4. **T. Mannii,** *Skan.* Stems ascending, about 1 ft. long, quadrangular, glabrous except for a few minute hairs on some of the nodes, sparingly and shortly branched. Leaves ovate, in distant pairs, usually 1¼ in. long, 9–11 lin. broad, glabrous, pellucid-punctate, acute, truncate-cuneate at the base, acutely serrate; petiole 4–7 lin. long. Flowers solitary in the axil of one of the leaves of the uppermost pair or pairs on the stem or on short axillary branches; peduncles ½–1 in. long, glabrous. Calyx glabrous, 5½ lin. long, 2-lipped, very narrowly 5-winged; teeth acuminate, about ¾ lin. long. Corolla purple (*Mann*), about 8 lin. long; upper lip oblong, 2 lin. long, 1½ lin. broad, concave inside; lobes of the lower lip suborbicular, about 1½ lin. in diam. Filaments of the anticous stamens with a subclavate appendage about 1 lin. long; anthers coherent in pairs. Capsule oblong, 4½ lin. long, bearing a beak about 1 lin. long. Seeds globose, tuberculate.

Lower Guinea. Gaboon: Sierra del Crystal, *Mann*, 1663!

28. **LINDERNIA**, Allioni in Misc. Taur. iii. 178, t. 5, fig. 1.

Calyx sometimes 5-partite with linear segments, sometimes shortly tubular-campanulate and 5-toothed; ribs not winged and usually not prominent. Corolla-tube cylindric or somewhat enlarged above; upper outside lip erect, broad, concave, emarginate or shortly 2-fid; lower lip larger, spreading, with 3 broad subequal lobes. Stamens 4, all perfect; posticous pair affixed to the corolla-tube, usually included; filaments filiform; anticous pair affixed to the throat; filaments elongate, arched, connivent under the upper lip, with a tooth-like or subulate appendage at the base; anthers closely approximate or coherent in pairs; cells divaricate, often confluent at the apex. Style bilamellate at the apex. Ovules many in each cell. Capsule linear, oblong, ovoid or globose, usually longer than the calyx, septicidal. Seeds many, foveolate-rugose. —Branched glabrous or pubescent usually annual herbs. Leaves opposite, usually dentate. Flowers small, sessile or pedunculate, solitary in the axils of the leaves, or in terminal racemes.—*Vandellia*, P. Browne in Linn. Mant. i. 12; Benth. et Hook. f. Gen. Pl. ii. 955. *Mitranthus*, Hochst. in Flora, 1844, 103.

Species about 35, mostly natives of the hotter regions of Asia, Africa and Australia; 1 species extends to south and west Europe, and 2 to Tropical America.

* Stems long, often creeping and rooting at the nodes.

Stems leafy; leaves ovate, ovate-orbicular to oblong; capsules 5–10 lin. long.
Calyx-teeth ovate, $\frac{1}{2}$–$\frac{2}{3}$ lin. long . . . 2. *L. brevidens.*
Calyx-teeth subulate, 1–2 lin. long.
Leaves ovate-elliptic or oblong, $\frac{3}{4}$–$1\frac{1}{2}$ in. long 4. *L. senegalensis.*
Leaves ovate or ovate-orbicular, 5–7 lin. long.
Capsules linear, acuminate, 8–10 lin. long . 5. *L. Vogelii.*
Capsules linear-oblong, acute, 5–7 lin. long.
Plant pubescent; leaves ovate-orbicular, obtuse . . . . . 1. *L. diffusa.*
Plant subglabrous; leaves ovate, acute . 3. *L. stictantha.*
Stems sparingly leafy; leaves linear or linear-lanceolate, rarely ovate; capsules 4–5 lin. long.
Leaves linear or linear-lanceolate; pedicels usually more than $\frac{1}{2}$ in. long.
Leaves 1 in. long, acute . . . . 6. *L. lobelioides.*
Leaves 3–$3\frac{1}{2}$ lin. long, obtuse . . . 7. *L. Newtonii.*
Leaves ovate to ovate-lanceolate; pedicels 1–$1\frac{1}{2}$ lin. long . . . . . 8. *L. Whytei.*

** Stems short, not creeping.

† Leaves broad.

Annual; corolla $2\frac{1}{2}$–4 lin. long.
Calx-teeth ovate, $\frac{1}{3}$–$\frac{1}{2}$ lin. long . . . 9. *L. nummulariæfolia.*
Calyx-teeth linear-lanceolate, $1\frac{1}{4}$–$2\frac{1}{2}$ lin. long.
Stems leafy; cauline leaves ovate or broadly ovate, up to 6 lin. long and broad.

Flowers 3–5, crowded at the apex of the stem; bracts linear-lanceolate; corolla with a blue upper lip and a white and yellow lower lip . . . . . 10. *L. rupestris.*
Flowers often many, in a loose spike-like raceme; bracts ovate; corolla yellow . . . . . 11. *L. insularis.*
Stems very sparingly leafy; cauline leaves elliptic-ovate, only 1½–3 lin. long . . . . . 12. *L. bifolia.*
Perennial; corolla 4½ lin. long . . . . 13. *L. abyssinica.*

†† Leaves narrow.

Plant erect, unbranched or sparingly branched.
Pedicels about as long as the bracts . . 14. *L. uvens.*
Pedicels 2 or 3 times as long as the bracts 15. *L. Stuhlmannii.*
Plant prostrate, much branched . . . 16. *L. debilis.*

1. **L. diffusa,** *Wettst. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 80. A pubescent diffusely branched procumbent annual herb, the branches sometimes rooting at the lower nodes. Leaves very shortly petiolate or sessile, ovate-suborbicular, usually 6–7 lin. long, obtuse, rounded or somewhat cuneate at the base, crenate-serrate. Flowers solitary in the axils of all the upper leaves; peduncles scarcely 1 lin. long. Calyx 3–3½ lin. long, sparingly and minutely pubescent; teeth subulate, 2¼–1½ lin. long, unequal, the posticous longest. Corolla white or flesh-coloured, 3½ lin. long; tube hairy inside from the base of the lower lip to halfway down. Anticous filaments with obovate or oblong very obtuse appendages. Capsule narrowly oblong, 4–7 lin. long, beaked.—Hiern in Cat. Afr. Pl. Welw. i. 763; Engl. in Schlechter, Westafrik. Kautsch.-Exped. 313. *Vandellia diffusa,* Linn. Mant. i. 89; Benth in DC. Prodr. x. 416; Durand & Schinz, Études Fl. Congo, i. 210; De Wild. & Durand, Contrib. Fl. Congo, i, fasc. 2. 45, and Reliq. Dewevr. 170. *Pyxidaria diffusa,* O. Kuntze, Rev. Gen. Pl. ii. 464.

Upper Guinea. Sierra Leone: Regent, *Scott-Elliot,* 4013! Sugarloaf Mountain, *Welwitsch,* 5924! and without precise locality, *Morson!* Liberia: Kaka Town, *Whyte!* Gold Coast: Begoro, *Johnson,* 696! Lagos: between Ibadan and Abeokuta, *Schlechter,* 12341! Southern Nigeria: Onitsa, *Barter,* 1766! Cameroons: Bipinde, *Zenker,* 1081! Batanga, *Bates,* 2! and without precise locality, *Preuss,* 1184! Fernando Po, *Mann,* 1441!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux,* 338!

South Central. Lower Congo: Stanley Pool, *Hens,* 322! Kinchassa, *Luja,* and near Leopoldville, *Dewèvre,* 525!

Also in Madagascar and Tropical America.

Var. *pedunculata,* Skan. Peduncles 2–5 lin. long.—*Vandellia diffusa,* var. β *pedunculata,* Benth. in DC. Prodr. x. 416.

Upper Guinea. Sierra Leone, *Vogel,* 111! *Barter!*

2. **L. brevidens,** *Skan.* Closely resembles *L. diffusa* in habit and foliage, but it is almost glabrous, and has longer peduncles and shorter calyx-teeth. Flowers axillary, solitary; peduncles 4½ lin. long. Calyx 2½ lin. long, 5-ribbed, the posticous and lateral ribs very narrowly winged; teeth ½–⅔ lin. long, somewhat unequal, ovate, acute. Corolla 4 lin. long. Anticous filaments gibbous at the base. Capsule narrowly oblong, 6 lin. long, acuminate.

Mozamb. Dist. German East Africa: Usambara, *Buchwald*, 295!

3. **L. stictantha,** *Skan.* A slender annual herb, prostrate or prostrate-ascending, subglabrous or minutely glandular-puberulous; stems ½–1 ft. long, sparingly branched. Leaves ovate, ½–1 in. long, 3–8 lin. broad, acute, slightly cuneate at the base, serrulate, rather fleshy; petiole 1–2 lin. long. Flowers axillary, solitary, alternate; peduncles 4–6 lin. long. Calyx 3–4 lin. long, 5-ribbed, unequally 5-toothed, hispidly pubescent on the ribs and hyaline between them; teeth lanceolate-subulate, 1¼–2 lin. long. Corolla about 3 lin. long, white, with scattered dark-purple dots; upper lip undivided, straight, rounded at the apex, fringed; lower lip trifid, with spreading lobes. Anticous filaments gibbous near the base. Capsule linear-oblong, 5–7 lin. long, acute.—*Ilysanthes stictantha,* Hiern in Cat. Afr. Pl. Welw. i. 765.

Lower Guinea. Angola: Golungo Alto; by the River Cuango, near Arimo do Isidro, *Welwitsch,* 5905! and in Sobato da Queta, *Welwitsch,* 5906!

4. **L. senegalensis,** *Skan.* A subglabrous branched ascending herb apparently 6–12 in. high; stems quadrangular; internodes 1½–2 in. long. Leaves ovate-elliptic or oblong, ¾–1½ in. long, 4–7 lin. broad, serrate, minutely ciliate, 3-nerved, obtuse, narrowed at the base into a very short petiole. Flowers axillary, solitary; peduncles 5–7 lin. long, elongating in the fruiting stage. Calyx 3½–3¾ lin. long; teeth subulate, 1–1¼ lin. long, unequal, the posticous longest, minutely ciliate. Corolla 4¼ lin. long; upper lip bifid. Anticous filaments with oblong obtuse hairy appendages. Capsule 6–8 lin. long, linear, acuminate.—*Vandellia senegalensis,* Benth. in DC. Prodr. x. 416, partly. *Pyxidaria senegalensis,* O. Kuntze, Rev. Gen. Pl. ii. 465.

Upper Guinea. Senegambia, *Heudelot,* 804! Senegal, *Leprieur! Perrottet,* 586! Sierra Leone, *Don! Barter!*

Bentham quotes under this species some specimens collected by Vogel on the Nun River, Niger Territory. These, however, belong to a distinct species, having quite a different habit and ovate-orbicular leaves only 5–7 lin. long. Bentham gives the length of the leaves as 1–1½ in., which applies to Heudelot's specimen, so I have retained his specific name for this, and have called the other species *L. Vogelii.*

5. **L. Vogelii,** *Skan.* A slender glabrous herb with procumbent sparingly branched stems 6–9 in. long. Leaves very shortly petiolate, coriaceous, ovate or ovate-orbicular, 5–7 lin. long, 4–6 lin. broad, crenate-serrate, obtuse, slightly cuneate at the base. Flowers axillary, solitary; peduncles 3–5 lin. long. Calyx 3½ lin. long; teeth subulate,

1–1⅓ lin. long, unequal, the posticous longest. Corolla 4 lin. long, white, tinted with red on the upper lip; tube hairy inside from the base of the lower lip to half-way down. Anticous filaments with oblong curved obtuse appendages. Capsule linear, 8–10 lin. long, acuminate. —*Vandellia senegalensis*, Benth. in DC. Prodr. x. 416, partly.

Upper Guinea. Southern Nigeria: Nun River, *Vogel!* wet sands by the Brass River, *Barter*, 27!

6. **L. lobelioides,** *Engl. Pfl. Ost-Afr. C.* 357. An erect or ascending herb ½–1 ft. high, glabrous except a few minute hairs on the calyx-teeth and margins of the younger leaves; stem simple or branched at the base. Leaves linear, entire, 1 in. long, 1½ lin. broad, acute, the lower sometimes purplish on the underside, the upper unequal in the same pair; floral leaves shorter. Flowers axillary, solitary; peduncles ⅔–1½ in. (rarely ¼–⅓ in.) long, suberect at the time of flowering. Calyx 2–3 lin. long, 5-fid; teeth acute, 1–1¼ lin. long. Corolla 4½–5½ lin. long, blue; upper lip broadly oblong, subtruncate; lower lip 3-lobed; lobes rounded. Anticous filaments obtusely tuberculate at the base, suddenly curved. Capsule (unripe) linear-oblong, acute or acuminate, 5 lin. long.—*Vandellia lobelioides*, Oliv. in Trans. Linn. Soc. xxix. 120, t. 121 B.

Nile Land. Abyssinia: Tigre, *Schimper*, 1222! Jur: Jur Ewet, *Schweinfurth*, 1769! Bongo: by the Lesi River, *Schweinfurth*, 4010! and without precise locality, *Petherick!* Uganda: Madi, *Speke & Grant!* Elgon district, *James!*

Mozamb. Dist. German East Africa: Unyamwezi; Msalala, *Hannington!* Lower Plateau, North of Lake Nyasa, *Thomson!* Nyasaland: North Nyasaland and Upper Loangwa River, near Fort Young, *Nicholson!* Shibisa to Tshinmuze, 2000–4000 ft., *Kirk!* Namasi, *Cameron*, 4!

7. **L. Newtonii,** *Engl. in Engl. Jahrb.* xxiii. 503, *t.* 9, *figs. M—N.* A small herb; stem creeping and rooting in the lower part, then ascending; internodes 2½–3 lin. long. Leaves linear, 3–3½ lin. long, ¾ lin. broad, obtuse. Flowers solitary, terminal; peduncles about 7½ lin. long. Calyx elongate-turbinate, 3 lin. long; teeth narrowly triangular, 1 lin. long. Corolla 4–5 lin. long; tube funnel-shaped, 2½–3 lin. long; upper lip oblong, 1½–2 lin. long; lower lip about 3 lin. long; lobes obovate. Stamens exserted; anticous filaments thickened and geniculate at the base.

Lower Guinea. Angola: Humpata; in damp places on the banks of the Rio Nive, *Newton*, 252.

8. **L. Whytei,** *Skan.* Stems apparently ascending, simple or branched, quadrangular, about 1 ft. long, sparingly leafy, glabrous. Leaves sessile, in distant pairs, broadly ovate to ovate-lanceolate, 3–7 lin. long, 2½–3½ lin. broad, acute or acuminate, dentate, rather thick, glabrous or minutely ciliate and sometimes with a few hairs on the nerves beneath. Flowers distant, in a terminal raceme; bracts passing from ovate below to subulate above, the upper shorter than the pedicels; pedicels 1–1½ lin. long. Calyx 3–4 lin. long, 5-ribbed, trans-

parent between the ribs, glabrous or ciliate on the teeth and ribs; teeth spreading, linear, 2–2½ lin. long, acuminate, keeled. Corolla blue with delicate pellucid veins, 5–6 lin. long; tube funnel-shaped, 4½ lin. long; upper lip 2 lin. long, ovate, emarginate, ciliate, sparingly pubescent outside; lower lip 4 lin. long, 3½ lin. broad, deeply 3-lobed, with a few long hairs at the base; lateral lobes oblong; median lobe elliptic. Anticous stamens exserted; appendages subclavate, curved, short, yellow, minutely tuberculate; anthers pale blue. Capsule (unripe) narrowly oblong, acute, as long as the calyx.

Nile Land. Uganda: Nandi, near water, *Scott-Elliot*, 7225! first and second days' march from Mumyas, *Whyte!*

Mozamb. Dist. German East Africa: Unyamwezi; Msalala, *Hannington!*

In the British Museum there is a fragmentary specimen collected by Gossweiler at Malange, Angola, which very closely resembles *L. Whytei*, and may prove to be the same species. It has, however, a shorter calyx-tube, longer teeth, and a smaller golden-yellow corolla with narrower tube scarcely longer than the calyx.

9. **L. nummulariæfolia,** *Wettst. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 79. An erect annual herb 2–4 in. high, usually with short spreading hairs on the stem and branches, on the margins and on the nerves of the underside of the leaves; stem simple or branched from the base upwards; branches straight, ascending, the lower longer than the upper. Leaves subsessile, ovate or suborbicular, 4–8 lin. long, 4–7 lin. broad, serrate or crenate-serrate. Flowers solitary in the axils of the upper leaves or sometimes in few-flowered subumbellate axillary racemes; peduncles 4–7 lin. long. Calyx sparingly pubescent, 1½ lin. long; teeth somewhat unequal, ⅓–½ lin. long, broad, acute. Corolla pale blue variegated with yellow, or purple (*Welwitsch*), 2½ lin. long; tube densely hairy inside from the base of the lower lip to half-way down; upper lip entire, oblong, 1½ lin. long, minutely ciliate; lobes of lower lip rounded, about ¾ lin. in diam. Anticous filaments bent and dilated at the base. Capsule 2½–3 lin. long, ovoid-oblong, shortly beaked.—Engl. Pfl. Ost-Afr. C. 357; Hiern in Cat. Afr. Pl. Welw. i. 763. *Vandellia nummularifolia*, D. Don, Prodr. Fl. Nep. 86; Benth. in DC. Prodr. x. 416; Hook. f. Fl. Brit. Ind. iv. 282. *Pyxidaria nummularifolia*, O. Kuntze, Rev. Gen. Pl. ii. 464.

Upper Guinea. Cameroons: Buea, *Preuss!*

Lower Guinea. Angola: Pungo Andongo: near Cabondo and Catete, *Welwitsch*, 5872! 5873!

Also in Northern India and Western China.

Var. *sessiliflora*, Hiern in Cat. Afr. Pl. Welw. i. 763. Flowers usually sessile or subsessile.—*L. sessiliflora*, Wettst. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 79; Engl. Pfl. Ost-Afr. C. 357. *L.? montana*, Hiern in Cat. Afr. Pl. Welw. i. 764. *Vandellia sessiliflora*, Benth. Scroph. Ind. 37, and in DC. Prodr. x. 416; Hook. f. Fl. Brit. Ind. iv. 282. *Mitranthus latifolius*, Hochst. in Flora, 1844, 103. *M. triflorus*, Hochst. in A. Rich. Tent. Fl. Abyss. ii. 120.

Lower Guinea. Angola: Pungo Andongo; *Welwitsch*, 5878! Huilla; Morro de Lopollo, *Welwitsch*, 5787!

Nile Land. Abyssinia: Tigre; Tacazze Valley, near Jelajeranne, *Schimper*, 1728!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5600 ft., *Volkens*, 2328! British Central Africa: Nyasaland; between Kondowe and Karonga, 2000–6000 ft., *Whyte!*

Also in Northern India.

In Whyte's specimen the capsules are sessile or on peduncles up to ½ in. long.

10. **L. rupestris,** *Engl. in Engl. Jahrb.* xxx. 402. An annual herb with fibrous roots; stem 2½–4 in. long, simple or sparingly branched, slenderly white-pilose chiefly on the angles; internodes 5–7½ lin. long. Leaves sessile, ovate, white-pilose on the nerves beneath, 3- or 4-toothed on each side, 3–5-nerved, middle ones about 5–6 lin. long, 3½–4 lin. broad, the lower and upper somewhat smaller. Flowers 3–5, crowded at the apex of the stem; bracts linear-lanceolate, 2½ lin. long; bracteoles narrowly linear, acute. Calyx-teeth linear-lanceolate, 2½ lin. long, ½ lin. broad, acute, white-pilose on the margins. Corolla-tube funnel-shaped, 1½ lin. long; upper lip broadly obcordate, blue, 1¼ lin. long; lower lip white with yellow spots, 2 lin. long; lateral lobes somewhat smaller than the anticous. Anticous filaments curved and gibbous at the base.

Mozamb. Dist. German East Africa: Eastern Livingstone Mountains; Ubena, in the Tsansingewe district, 6900 ft., *Goetze*, 811.

11. **L. insularis,** *Skan.* An annual herb 2–5 in. high; stem erect or erect-spreading, usually more or less crooked, simple or usually few-branched, sharply quadrangular, slightly twisted, minutely glandular-pubescent, leafy; branches opposite or alternate, 1½–3½ in. long, erect-spreading, often crooked; internodes 4–15 lin. long. Leaves opposite, sessile, broadly ovate or the lowermost pair shortly oblong, very thin, somewhat acute, obtuse or rounded, rounded at the base, minutely and very sparingly glandular-pubescent, toothed; lowermost leaves 9–12 lin. long, 6–8 lin. broad; upper 4–6 lin. long, 3–6 lin. broad, becoming gradually smaller from below upwards; teeth usually 4 or 5 each side, very small. Flowers few or many in loose spike-like terminal or lateral racemes, one to each pair of bracts; bracts broadly ovate, 3–1 lin. long and broad, becoming smaller from below upwards, unequal in size in each pair, the smaller subtending the flower, coarsely few-toothed; pedicels ⅓–⅔ lin. long. Calyx 2–2½ lin. long, rather densely but minutely glandular-pubescent; teeth narrowly linear-lanceolate, 1¾ lin. long, acuminate. Corolla yellow, 3½–4 lin. long; tube 2 lin. long, ⅔ lin. broad; upper lip oblong-ovate, about 1½ lin. long, minutely denticulate, shortly 2-lobed; lower lip about 2 lin. long and 2½ lin. broad, with a small crest of golden-yellow clavate hairs in the middle; lobes rounded, about 1 lin. in diam., minutely denticulate. Anticous filaments with a golden-yellow knee-like appendage about ¼ lin. long at the base. Capsule globose-obovoid, very slightly longer than the calyx, obtuse, glabrous.

Nile Land. Uganda : Lake Victoria ; Sesse Island, 3900 ft., *Brown*, 117.

12. **L. bifolia,** *Skan.* A slender erect annual herb 2–4½ in. high, branched from the base and sometimes sparingly branched above, covered (in some places rather densely) with short spreading grey hispid hairs ; root slender, with very few fibres ; stems quadrangular. Leaves in a basal pair, and 1 or 2 pairs of very small ones on the stem when this is branched ; basal leaves elliptic-ovate, sessile, 5–7 lin. long, 3–5 lin. broad, thin, acute, obscurely few-toothed, nearly glabrous below ; cauline leaves similar to the basal, but only 1½–3 lin. long. Inflorescence a few-flowered terminal raceme ; flowers usually alternate ; bracts opposite, subulate, ½–¾ lin. long ; pedicels ½–1¼ lin. long. Calyx 1¾–2 lin. long, prominently 5-ribbed, sparingly and hispidly hairy, purple in fruit ; teeth 1¼–1½ lin. long, linear-lanceolate, acute. Corolla 4 lin. long ; upper lip oblong-ovate, 1¾ lin. long, obtuse, emarginate ; lower lip 2¾ lin. long, 3 lin. broad, with a crest of clavate golden-yellow hairs at the base ; lateral lobes elliptic, 1¼ lin. long, 1 lin. broad ; median lobe suborbicular, 1⅓ lin. in diam. Anticous filaments with a slender capitate pubescent appendage near the base. Capsule ellipsoid-globose, shorter than the calyx, apiculate.

Mozamb. Dist. British Central Africa : Kambole, south-west of Lake Tanganyika, about 5000 ft., *Nutt !*

13. **L. abyssinica,** *Engl. in Engl. Jahrb.* xxiii. 503, *t.* 9, *figs. A—E.* An erect perennial herb about 2 in. high, branched from the base, bearing numerous fibrous roots ; stem quadrangular, glabrous, leafless at the base but marked with rather crowded leaf-scars; branches sparingly and minutely pubescent. Leaves crowded on the stem, in rather distant pairs on the branches, sessile, elliptic, 3–6 lin. long, 2–3½ lin. broad, obtuse, somewhat narrowed at the base, remotely serrulate, glabrous above, sparingly and shortly pubescent below, ciliate. Flowers axillary, solitary, usually alternate : peduncles 3–6 lin. long. Calyx 2¾ lin. long with a few short hispid hairs on the upper part, often coloured purple ; teeth triangular, ½–¾ lin. long, subacute. Corolla apparently yellow, 4½ lin. long ; tube hairy inside from the base of the lower lip to half-way down ; upper lip ovate, 2 lin. long, denticulate ; lobes of the lower lip denticulate. Anticous filaments dilated and sharply bent at the base. Capsule about 3½ lin. long, oblong, acute.

Nile Land. Abyssinia : Begemeder ; on rocks near Gafat, 8850 ft., *Schimper*, 1164 !

14. **L. uvens,** *Hiern in Cat. Afr. Pl. Welw.* i. 763. An annual herb 2–4 in. high, nearly glabrous ; stem erect, tetragonal, minutely scabrid-puberulous, slender, leafy below, sparingly leafy above. Leaves opposite or the uppermost floral ones alternate, sessile, ovate, oblong or lanceolate, 1–4 lin. long, obtuse or the floral subacute, more or less broad at the base, minutely glandular-punctate and pulverulent-

puberulous, minutely ciliolate. Flowers few, terminal and in axils of the upper leaves; peduncles very short. Calyx campanulate-oblong, 2 lin. long, shortly 5-cleft; teeth ovate at the base, acuminate, ciliolate, about half as long as the smooth tube. Corolla about 3 lin. long, bilabiate, blue. Stamens 4, all perfect. Style $1\frac{1}{2}$ lin. long, rather thickened upwards; stigma rather dilated.

Lower Guinea. Angola: Huilla; in wet pastures on the Humpata plateau, rather rare, *Welwitsch*, 5784!

The above is taken from Mr. Hiern's description.

15. **L. Stuhlmannii,** *Engl. Pfl. Ost-Afr. C.* 357. An erect herb about 5 in. high, branched from the base; branches erect, glabrous, longitudinally sulcate. Leaves few, the basal linear, the cauline short, lanceolate. Flowers in short terminal racemes; pedicels 2–3 times longer than the very short bracts, nearly as long as the flower, deflexed at the time of flowering. Calyx-teeth triangular, half as long as the tube. Corolla twice as long as the calyx; upper lip shortly bilobed, equal in size to the lobes of the lower lip. Anticous filaments geniculate. Capsule elongate-fusiform, nearly twice as long as the calyx.—Engl. Jahrb. xxiii. 503, t. 9, figs. F—L.

Mozamb. Dist. German East Africa: in marshes, East Uzinja, *Stuhlmann*, 3550.

The figure represents this plant with leaves scarcely 2 lin. long and pedicels 1 lin. long or less, and with the upper lip of the corolla quite entire.

16. **L. debilis,** *Skan.* A weak much branched prostrate annual herb; branches up to $2\frac{1}{2}$ in. long, glabrous, quadrangular. Leaves sessile, very thin, lanceolate to linear-lanceolate, 2–5 lin. long, $\frac{1}{2}$–$1\frac{3}{4}$ lin. broad, obtuse or acute, slightly narrowed at the base, entire or minutely few-toothed, glabrous; floral leaves more or less unequal in the same pair. Flowers solitary in the axils of the smaller leaves of the upper pairs; peduncles about $\frac{1}{2}$ lin. long. Calyx $1\frac{1}{2}$ lin. long, very sparingly glandular-pubescent, prominently 5-ribbed; teeth subulate, minutely ciliate, unequal, 1–$1\frac{1}{4}$ lin. long. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; upper lip purplish, emarginate; lower lip yellow with purple lines, deeply 3-lobed. Anticous filaments with very small appendages near the base. Capsule oblong, acute, slightly shorter than the calyx.

Nile Land. Bongo; Gir, *Schweinfurth*, 2516!

Imperfectly known species.

17. **L. Dinteri,** *Schinz in Mém. Herb. Boiss.* xx. 27. Habit of *L. abyssinica.* Leaves opposite, sessile, decurrent, lanceolate, about 6 lin. long and $1\frac{1}{2}$ lin. broad, acute, almost fleshy, with 3 or 4 distant serrate teeth each side. Flowers axillary, solitary, shortly stalked. Calyx 5-toothed, broadly 5-winged; teeth linear-lanceolate, about 1 lin. long. Corolla unknown. Capsule about 2 lin. long, septicidal.

Lower Guinea. German South-west Africa: Hereroland; Waterberg Plateau, *Dinter*, 563.

I suspect from the description that this is a *Torenia* and probably *T. spicata.*

29. **ILYSANTHES,** Rafin.; Benth. et Hook. f. Gen. Pl. ii. 955.

Calyx 5-partite or 5-toothed; segments or teeth narrow, scarcely imbricate. Corolla-tube cylindric or somewhat enlarged above; upper lip outside, erect, broad, concave, usually shortly bifid; lower lip larger, spreading; lobes 3, broad, subequal. Stamens 2, posticous, affixed to the corolla-tube, subincluded; filaments filiform; anthers subcoherent, cells divaricate; staminodes 2, anticous, 2-lobed (one lobe glandular, obtuse, the other slender, acute, sometimes minute, sometimes elongated, rarely bearing an empty anther) or entire, linear or clavate, obtuse, glandular. Style shortly bilamellate at the apex. Ovules numerous in each cell. Capsule ovate, oblong to linear, septicidal; valves slender, entire. Seeds numerous, foveolate-rugcse.—Herbs, usually annual, slender, creeping or erect, branched, glabrous or more rarely pubescent, often growing in marshy places. Leaves opposite, entire or toothed. Flowers small, axillary and solitary, or in terminal racemes; peduncles or pedicels ebracteolate, often deflexed in fruit.—*Bonnaya*, Link et Otto, Ic. Pl. Sel. 25, t. 11; Benth. et Hook. f. Gen. Pl. ii. 956.

Species about 35, in nearly all warm countries, chiefly in Africa and Asia.

I. reptans, Urb., is not African. De Wildeman (*Notices Pl. Utiles du Congo*, 549) refers to a plant by this name which is used in the Congo Free State as forage for oxen.

Calyx deeply 5-cleft.
- Terrestrial plants; stems leafy; corolla 2–3½ lin. long.
  - Stems creeping; leaves about as broad as long . 1. *I. rotundifolia.*
  - Stems erect; leaves longer than broad . . . 2. *I. parviflora.*
- Aquatic plant; stems naked except near the apex; corolla about 6 lin. long . . . . . 3. *I. conferta.*

Calyx 5-toothed.
- Leaves radical . . . . . 4. *I. Welwitschii.*
- Leaves cauline.
  - Leaves spathulate, ovate or elliptic-oblong.
    - Peduncles ½–1 lin. long . . . . . 5. *I. nana.*
    - Peduncles 3–9 lin. long . . . . . 6. *I. pulchella.*
  - Leaves linear-lanceolate or linear-oblong.
    - Corolla-tube distinctly longer than the calyx; calyx-teeth acute or rather narrow at the apex.
      - Plant only 1–2 in. high; stems simple or sparingly branched; calyx-teeth narrow at the apex but not acute; upper lip of corolla emarginate.
        - Stems creeping at the base; leaves 3–6 lin. long; calyx 1¼–1½ lin. long; corolla 3–4 lin. long . . . . . 7. *I. pusilla.*
        - Stems erect; leaves 1½–2 lin. long; calyx scarcely 1 lin. long; corolla about 2½ lin. long . . . . . 8. *I. ugandensis.*
      - Plant up to 5 in. high; stems much branched; calyx-teeth acute; upper lip of corolla bifid, with acute lobes . . . . 9. *I. gracilis.*

Corolla-tube not longer than the calyx; calyx-teeth rounded at the apex . . . 10. *I. andongensis.*
Leaves narrowly linear.
Plant tall, erect, with long very slender branches.
Pedicels 2–6 lin. long; upper lip of the corolla deeply bifid . . . . . 12. *I. Schweinfurthii.*
Pedicels usually scarcely 1 lin. long; upper lip of the corolla shortly bifid . . 13. *I. Barteri.*
Plant dwarf, with short spreading stiff branches 11. *I. trichotoma.*

1. **I. rotundifolia,** *Benth. in DC. Prodr.* x. 420. A diffusely branched herb, glabrous or slightly pulverulent-pubescent on the younger parts; stems a few inches to a foot long, weak, creeping, often rooting at the nodes. Leaves sessile, often semiamplexicaul, ovate to orbicular, 2–5 lin. long, 1½–5 lin. broad, obtuse, rarely acute, 3–5-nerved, entire or few-toothed, minutely glandular-punctate. Flowers axillary, solitary; peduncles 3–6 lin. long in flower, up to 8 lin. long in fruit, at first ascending, becoming spreading or deflexed in fruit. Calyx 1¼–1½ lin. long, divided nearly to the base; lobes lanceolate or lanceolate-oblong, acute. Corolla 2–3½ lin. long, white; upper lip shortly bifid; lower lip 3-lobed; lobes rounded. Capsule globose-ellipsoid, from a little shorter to somewhat longer than the calyx.—Vatke in Oest. Bot. Zeitschr. 1875, 11; Engl. Pfl. Ost-Afr. C. 357; Hook. f. Fl. Brit. Ind. iv. 284.

Nile Land. Uganda; Ruwenzori, about 6200 ft. *Scott-Elliot*, 7793!

Mozamb. Dist. Zanzibar: in humid chiefly cultivated places, *Hildebrandt*, 1010.

Also in the Mascarene Islands, India and Ceylon.

2. **I. parviflora,** *Benth. in DC. Prodr.* x. 419. A slender usually much branched herb, glabrous or slightly pulverulent, erect or decumbent, 3–9 in. high. Leaves sessile or the lower very shortly petiolate, ovate, ovate-lanceolate, elliptic or oblong, 2–6 lin. long, 1–4 lin. broad, usually acute, entire or rarely with a few minute teeth, gland-dotted, 1–5-nerved. Flowers axillary or in terminal racemes; pedicels slender, 3–9 lin. long. Calyx (in flower) 1–1½ lin. long, divided nearly to the base; lobes lanceolate or linear-lanceolate, acute or acuminate. Corolla 2¼–2¾ lin. long, white or blue. Capsule subglobose to ovoid-oblong, somewhat longer than the calyx.—Engl. in Engl. Jahrb. viii. 65; Hook. f. Fl. Brit. Ind. iv. 283; Schweinf. Beitr. Fl. Aethiop. 99.

Lower Guinea. Lower Congo: sandy places near Ponta da Lenha, *Naumann.*

Nile Land. Soudan: island in the Nile, near Dabbe, *Ehrenberg.* Sennar; near Roseires and near Famaka, *Cienkowsky.* Jur; Jur Ghattas, *Schweinfurth*, 1986! Bongo; Gir, *Schweinfurth*, 2511!

Mozamb. Dist. Portuguese East Africa; Shire Valley above Morambala Marsh, *Scott!* mouth of the Zambesi, *Kirk!*

Also in India and Siam.

3. **I. conferta,** *Hiern in Dyer, Fl. Cap.* iv. ii. 365. A glabrous or nearly glabrous aquatic herb; stems erect, 4–8 in. long, rather slender, usually simple, tetragonal at least above, submerged below, naked except at the apex through the fall of the lower leaves, rooting at the base. Leaves opposite, crowded at and near the apex of the stem, shortly petiolate or sessile and slightly sheathing, oblong-obovate, 2–8 lin. long, 1–3 lin. broad, very obtuse, entire, somewhat fleshy-coriaceous, green or red-purple, glossy and minutely dotted above, minutely glandular beneath. Flowers axillary, solitary; peduncles about 3 lin. long. Calyx $1\frac{1}{5}$–$1\frac{1}{2}$ lin. long, deeply lobed; segments ovate or broadly oblong, rather more than $\frac{1}{2}$ lin. broad, unequal in breadth, imbricate, obtuse. Corolla crimson; tube $2\frac{1}{4}$ lin. long, $1\frac{1}{4}$ lin. broad at the base, $1\frac{3}{4}$ lin. broad near the limb; upper lip deltoid-ovate, entire, 2 lin. long; lower lip deeply 3-lobed, about 4 lin. long. Upper stamens shortly exserted; staminodes simple, incurved, 1 lin. long. Capsule oblong-ovoid, compressed, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, crowned by the rather thick persistent style.—*I. Plantaginella*, S. Moore in Journ. Bot. 1905, 49.

Mozamb. Dist. Rhodesia: Matoppo Hills, in streams running over granite, *Eyles*, 47!

Also in the Transvaal and Natal.

4. **I. Welwitschii,** *Engl. in Engl. Jahrb.* xxiii. 504, *t.* 9, *figs. O—R.* An erect herb $1\frac{1}{4}$–2 in. high, bearing a tuft of long fibrous roots; stem scapose, simple, very slender, purple, minutely pubescent. Leaves in a small tuft at the base of the stem, linear-spathulate, $2\frac{1}{2}$–5 lin. long, $\frac{3}{4}$–1 lin. broad, fleshy, obtuse. Flowers solitary and terminal or in 1–4 pairs with an odd terminal one; bracts lanceolate or ovate-lanceolate, 1 lin. long; peduncles slender, 4 lin. long. Calyx $2\frac{1}{4}$ lin. long, purplish; teeth $\frac{3}{4}$ lin. long, oblong, obtuse. Corolla about $4\frac{1}{2}$ lin. long, whitish, the lower lip purplish; upper lip slightly emarginate; lower lip bearded in the middle; lobes crisped. Staminodes rather large, gibbous, obovoid. Capsule (immature) elliptic, acute, slightly longer than the calyx.—Hiern in Cat. Afr. Pl. Welw. i. 764.

Lower Guinea. Angola: Huilla; in very elevated damp places in Morro de Lopollo, *Welwitsch*, 5781!

5. **I. nana,** *Engl. in Engl. Jahrb.* xxiii. 505. An erect somewhat tufted herb $1\frac{1}{4}$–$1\frac{1}{2}$ in. high; stems quadrangular, minutely pubescent, rather leafy. Leaves somewhat fleshy, glabrous, the lower spathulate, 4–5 lin. long, 2–$2\frac{1}{2}$ lin. broad, petiolate, the upper sessile, ovate, up to 6 lin. long and 4 lin. broad, all obtuse, distinctly or obscurely toothed. Peduncles $\frac{1}{2}$–1 lin. long, in the axils of the upper leaves. Calyx about $1\frac{1}{2}$ lin. long; teeth ovate-lanceolate, $\frac{3}{4}$ lin. long, acute. Corolla about $2\frac{1}{2}$ lin. long, purple or white, with the lower lip purplish; lobes denticulate. Staminodes gibbous, bearing a slender filament about $\frac{1}{5}$ lin. long. Capsule fusiform, about 3 lin. long, acuminate.—Hiern in Cat. Afr. Pl. Welw. i. 764, and in Dyer, Fl. Cap. iv. ii. 365.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 5788! pastures of Empalanca, *Welwitsch*, 5789!

Also in the Transvaal and Natal.

6. **I. pulchella,** *Skan.* An erect herb 2–2½ in. high, branched from the base, thinly covered on the branches and leaves with short rather stiff whitish hairs. Leaves elliptic-oblong, 2–5 lin. long, 1–2 lin. broad, sessile or the lower subsessile, obtuse, few-toothed. Flowers axillary, solitary; peduncles glabrous or nearly so, 3–9 (usually about 5) lin. long. Calyx 2¼ lin. long, slightly 5-angled, with narrow scarious spaces between the angles; teeth ½ lin. long, ovate or ovate-elliptic, obtuse, minutely ciliate. Corolla 4½–5 lin. long; upper lip ovate, contracted near the apex, 2–2½ lin. long, bifid; teeth ovate, acute, scarcely ½ lin. long; lower lip 2½ lin. long, 3 lin. broad; lateral lobes obovate, 1¼ lin. long, 1 lin. broad; median lobe suborbicular, 1½ lin. in diam. Staminodes gibbous, with a very short proboscis-like appendage. Capsule 3–3½ lin. long, about 1 lin. broad, oblong, acute.

Mozamb. Dist. British Central Africa: Nyasaland; plateau of Mount Zomba, 5000–6000 ft., *Whyte!*

This closely resembles *I. Bolusii*, Hiern, from extra-tropical Transvaal, but differs in its very obtuse calyx-teeth and the form of the staminodes.

A fragment collected on the Inyanga Mountains, Rhodesia, by Mr. Evelyn Cecil (209) is probably *I. pulchella*, but the rich purplish-blue flowers are larger than those of the type.

7. **I. pusilla,** *Urban in Ber. Deutsch. Bot. Ges.* 1884, 435. A glabrous or sparingly and minutely pubescent herb 1½–2 in. high; stem simple or sparingly branched, creeping at the base, then ascending or erect. Leaves linear-lanceolate or linear-oblong, ¼–½ in. long, rather obtuse, entire. Peduncles 2–3 lin. long, in the axils of the upper leaves, spreading in fruit. Calyx 1¼-1½ lin. long, 5-toothed; teeth scarcely ½ lin. long, semi-ovate, obtuse. Corolla 3–4 lin. long, white, slightly marked on the underside with red; upper lip erect, emarginate; lower lip convex, broadly 3-lobed. Staminodes very minute. Capsule linear-oblong, 3–4 lin. long, acute, with divergent valves.—*Bonnaya pusilla*, Oliv. in Trans. Linn. Soc. xxix. 121, t. 122 A.

Mozamb. Dist. German East Africa: Karagwe, 5500 ft., by water and rock, *Speke & Grant!*

8. **I. ugandensis,** *Skan.* An erect very slender sparingly and minutely hispidly pubescent herb 1–1½ in. high; stem simple or few-branched; branches erect-spreading. Leaves sessile, linear-oblong or linear-lanceolate, 1½–2 lin. long, about ½ in. broad, obtuse, entire, rather fleshy. Flowers solitary in the axils of the upper leaves; peduncles very slender, 1½–3 lin. long, suberect in flower. Calyx scarcely 1 lin. long; teeth ovate or almost deltoid, ¼–⅓ lin. long, obtuse but narrow at the apex, purple-tipped. Corolla about 2½ lin. long; tube funnel-shaped, 1½ lin. long; upper lip oblong-ovate, nearly 1 lin. long and ¾ lin. broad, very slightly emarginate, minutely ciliate; lower lip 1¾ lin.

long and broad; lateral lobes ovate, about ½ lin. long; median lobe obovate, nearly 1 lin. long and broad. Staminodes very minute, filiform. Capsule narrowly oblong, about 3 lin. long.—*I. andongensis*, S. Moore in Journ. Linn. Soc. xxxvii. 190, not of Hiern.

Nile Land. Uganda: near the River Rufua, *Bagshawe*, 519 A!

9. **I. gracilis,** *Skan.* An erect slender minutely and hispidly pubescent herb 3–5 in. high; stem quadrangular, simple or freely branched in the upper part; branches ascending. Leaves sessile, oblong-linear or lanceolate-oblong, 3–5 lin. long, ¾–1½ lin. broad, obtuse, entire or obscurely few-toothed. Flowers solitary in the axils of the upper leaves; peduncles 3–5 lin. long, ascending in flower and fruit. Calyx 1½–1¾ lin. long; teeth ovate-lanceolate, somewhat unequal, about ½ lin. long, acute. Corolla 3 lin. long; upper lip ovate, 1 lin. long, bifid, with short broad acute lobes; lobes of the lower lip suborbicular. Staminodes gibbous, with short filaments minutely capitate at the apex. Capsule oblong-linear, 3½–4 lin. long, ¾ lin. broad, acute, with divergent valves.

Upper Guinea. Northern Nigeria: Nupe: Jeba on the River Quorra (Niger), *Barter!*

Welwitsch 5879, a tiny solitary flowered specimen, should probably be referred here.

10. **I. andongensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 765. An erect usually much branched glabrous or minutely pubescent herb, 2–3 in. high; stem and branches quadrangular. Leaves sessile, linear-oblong, usually 2–4 lin. long, obtuse, entire or slightly repand. Flowers solitary, axillary; peduncles 2–6 lin. long. Calyx 1–1½ lin. long; teeth oblong, about ½ lin. long, rounded at the apex. Corolla about 2 lin. long, purple; tube about as long as the calyx; upper lip scarcely ¾ lin. long, bifid, with short acute lobes; lower lip scarcely 1 lin. long and broad; lateral lobes shortly oblong, ½ lin. long; median lobe broadly obovate, about ½ lin. long and broad. Staminodes linear, flattened, about ¼ lin. long, without a gibbosity at the base. Capsule oblong or linear-oblong, about 3 lin. long.

Lower Guinea. Angola: Pungo Andongo; in damp pastures between Candumba and the River Cuanza, *Welwitsch*, 5871!

Welwitsch, 5879, is distinct from the above and is probably *I. gracilis.*

11. **I. trichotoma,** *Urban in Ber. Deutsch. Bot. Ges.* 1884, 435. A diffuse glabrous trichotomously branched herb, about 3½ in. high; stems quadrangular. Leaves sessile, linear-oblong, ¼–⅓ in. long, acute, entire. Peduncles alternate in the axils of the upper reduced leaves, 2–3½ lin. long, deflexed in fruit. Calyx 1¼ lin. long, 5-toothed; teeth scarcely ½ lin. long, semi-ovate, acute. Corolla blue, 2–3 lin. long; upper lip slightly emarginate; lower lip deeply 3-lobed. Staminodes entire, subsessile. Capsule 2–2¼ lin. long, ellipsoid, acute.—*Bonnaya trichotoma*, Oliv. in Trans. Linn. Soc. xxix. 121, t. 122 B.

Nile Land. Uganda: Madi, on rocky ground, *Speke & Grant!* Mumias, 4500 ft. *Whyte!* Entebbe, 3900 ft., *Brown*, 249!

12. **I. Schweinfurthii,** *Engl. in Engl. Jahrb.* xxiii. 504. A slender cæspitose glabrous or sparingly pubescent herb, 4–8 in. high; stems erect, simple or branched at the base, quadrangular. Leaves linear, 2½–5 lin. long (the uppermost smaller), rather thick and obtuse, entire. Flowers in a loose raceme; bracts ½–1½ lin. long, unequal in the same pair; pedicels 2–6 lin. long, deflexed in fruit. Calyx 1¾ lin. long, 5-ribbed, pale green on the ribs and transparent between; teeth ⅓ lin. long, lanceolate, acute, sparingly ciliate. Corolla about 4½ lin. long, lilac; tube only about ⅓ lin. broad; upper lip deeply bifid, with narrow lobes ¾ lin. long. Staminodes oblong. Capsule fusiform, acute, 2½ lin. long.

Nile Land. Niamniam: Gumango Hill, *Schweinfurth,* 3889! 3931! by the Ibba River, near Nganye, *Schweinfurth,* 3991!

Var. *linearifolia,* Engl. in Engl. Jahrb. xxiii. 504.—Leaves narrowly linear, acute. Calyx-teeth narrowly triangular, very acute.

Upper Guinea. Sierra Leone, *Afzelius.*

I have not seen Afzelius' plant. It should be compared with *I. Barteri.*

13. **I. Barteri,** *Skan.* Very closely resembles *I. Schweinfurthii,* Engl., but the pedicels are usually scarcely 1 lin. long; calyx-teeth acuminate; corolla 2–2½ lin. long; upper lip bifid, with the teeth broad and only about ⅕ lin. long; staminodes short and ligulate, tapering somewhat at the apex; capsule 1½ lin. long.

Upper Guinea. Northern Nigeria: Nupe; Jeba, on the River Quorra (Niger), *Barter!*

30. **DINTERA,** Stapf in Mém. Herb. Boiss. xx. 27.

Flowers cleistogamous. Calyx deeply 5- (rarely 6-) fid; segments oblong, obtuse. Corolla about as long as the calyx, ellipsoid; tube sprinkled with sessile glands inside on the anticous part, closed by minute lips; upper lip outside, shortly 2-lobed; lower lip 3-lobed. Stamens 2, anticous; filaments very short, glabrous, inserted above the middle of the corolla-tube; anther-cells unequal, "indehiscent or imperfectly indehiscent"; connective between the cells distinct; staminodes none. Ovary ellipsoid-globose, 1-celled; style very short; stigma somewhat thickened; placentas parietal, bifurcate, shield-shaped; ovules many. Capsule orbicular-obovate, somewhat compressed on one side, septicidal at the apex or bursting irregularly. Seeds many, minute, oblong, more or less compressed, foveolate.—A dwarf subcæspitose quite glabrous aquatic submerged herb; stem broadly 4-winged. Leaves opposite, sessile, ovate. Flowers axillary, solitary, sessile, minute, ebracteate.

An endemic monotypic genus allied to *Bythophyton,* Hook. f.

1. **D. pterocaulis,** *Stapf in Mém. Herb. Boiss.* xx. 29, *t.* 1 *fig. A.* Herb about 4 in. high; stems branched chiefly near the base, 4-winged; wings thin, more than ½ lin. broad; internodes up to 5 lin.

long. Leaves broadly ovate, semiamplexicaul, acute, recurved at the apex, thickened on the margins, 5-nerved, the larger 3 lin. long and 2 lin. broad. Calyx in the flowering stage scarcely $\frac{3}{4}$ lin. long, 1–$1\frac{1}{4}$ lin. long when in fruit; segments 3 times longer than the tube, 1-nerved. Corolla $\frac{1}{2}$–$1\frac{1}{4}$ lin. long; upper lip somewhat longer than the lower; lobes all minute. Outer anther-cells almost twice as large as the inner, obovoid, subacute or obtuse at the base. Capsule up to $1\frac{1}{2}$ lin. long.

Lower Guinea. German South-west Africa: Hereroland; Waterberg Plateau, in water, *Dinter*, 568.

31. **HYDRANTHELIUM**, H. B. & K.; Benth. et Hook. f. Gen. Pl. ii. 957.

Calyx 4–5-partite; segments oblong or elliptic or the lateral lanceolate. Corolla shortly infundibuliform-campanulate, 3–5-fid; lobes concave or cucullate, imbricate, unequal. Stamens 3 to 4, sometimes 2 or 5, affixed to the throat of the corolla, exserted; filaments short; anthers rather large, 2-celled; cells parallel. Style dilated at the apex, very slightly 2-lobed. Ovules many. Capsule ovoid or ellipsoid; valves entire. Seeds many, oblong, incurved, pendulous, striate, carunculate at the hilum.—Slender hairy or glabrous creeping or prostrate herbs growing in marshy places and on wet rocks. Leaves opposite, sessile, 3–7-nerved, entire or crenate at the apex. Flowers small, white, pedunculate in the axils of the leaves, ebracteolate.

Species 2 or 3, also in Guatemala, Western Tropical South America.

1. **H. egense,** *Poepp. & Endl. Nov. Gen. Sp.* iii. 75, *t.* 287. A slender pulverulent or more or less pilose herb; stems up to about 6 in. long, simple or sparingly branched, creeping and rooting at the nodes. Leaves ovate or suborbicular, 4–8 lin. long, 2–5 lin. broad, rounded at the apex, cuneate or sometimes broad at the base, 3–7-nerved, gland-dotted, entire or slightly crenate at the apex. Peduncles 3–7 lin. long. Calyx $1\frac{3}{4}$ lin. long, 4- or 5-partite; segments unequal, oblong to linear-oblong, obtuse. Corolla $2\frac{1}{2}$ lin. long, unequally 3–5-lobed, fragrant (*Barter*). Stamens 3 or 4, rarely 2 or 5. Capsule globose-ellipsoid, 1–$1\frac{1}{2}$ lin. long, obtuse.—Benth. in DC. Prodr. x. 425. *Herpestis Monnieria*, Durand & Schinz, Études Fl. Congo, i. 209 (excl. synonymy), not of H. B. & K.

Upper Guinea. Southern Nigeria: Onitsa, overrunning the muddy margins of streams, *Barter*, 1252!

South Central. Congo Free State: Congo; at the mouth of the Kasai River, *Hens*, 119!

Also in Guatemala and Western Tropical South America.

32. **LIMOSELLA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 958.

Calyx campanulate, 5-toothed. Corolla-tube short, subrotate-campanulate; limb 5-fid, spreading; lobes rounded or ovate-oblong, imbricate, subequal. Stamens 4, affixed to the corolla-tube, usually shortly exserted; filaments filiform; anthers 1-celled by confluence. Ovary shortly 2-celled at the base, the septum disappearing above; style short, incurved and thickened at the apex; ovules many. Capsule subindehiscent or at length 2-valved; valves entire. Seeds small, ovoid, striate, somewhat rugose.—Small cæspitose creeping or floating glabrous herbs, stemless or with stolon-like stems. Leaves radical or fascicled at the nodes, rarely alternate on some of the branches; petiole long; blade linear like the petiole or oblong-ovate or spathulate. Peduncles axillary, often shorter than the leaves, ebracteate. Flowers lilac, white or pale rose, usually small.

Species 6 or 7, 2 of which are widely distributed in all temperate regions; 3 are limited to Tropical and South Africa, and 1 to Australia.

Corolla-lobes distinctly shorter than the calyx.	
Very slender; blade of the leaf up to $\frac{3}{4}$ in. long; peduncles 1–12 lin. long	1. *L. aquatica.*
Stouter; blade of the leaf up to $1\frac{3}{4}$ in. long; peduncles $\frac{3}{4}$–$2\frac{1}{2}$ in. long	2. *L. maior.*
Corolla-lobes as long or nearly as long as the calyx	3. *L. capensis.*

1. **L. aquatica,** *Linn. Sp. Pl. ed.* i. 631. A small tufted glabrous annual aquatic or marsh herb, often producing stolons bearing one or more tufts of leaves and rooting at every tuft, sometimes with branches having alternate leaves. Leaves usually in radical tufts, erect, suberect or floating, very variable in size and shape, narrowly spathulate to broadly oblong, sometimes linear; blade $1\frac{1}{2}$–9 lin. long, $\frac{1}{2}$–5 lin. broad, obtuse, entire; petiole $\frac{1}{4}$–4 in. long, usually very slender. Flowers axillary, solitary; peduncles 1–12 lin. long, erect or suberect in flower, often deflexed in fruit. Calyx about 1 lin. long; teeth broader than long, minutely apiculate. Corolla lilac, white or pale rose, slightly longer than the calyx; lobes spreading, ovate-oblong, about $\frac{2}{3}$ lin. long. Capsule subglobose, about $1\frac{1}{2}$ lin. in diam.—Benth. in DC. Prodr. x. 426; A. Rich. Tent. Fl. Abyss. ii. 122; Engl. Hochgebirgsfl. Trop. Afr. 378; Hiern in Dyer, Fl. Cap. iv. ii. 356, with synonymy; Schweinf. Beitr. Fl. Aethiop. 99; Hook. f. Fl. Brit. Ind. iv. 288; Reichb. Ic. Fl. Germ. xx. t. 1722, fig. 1.

Upper Guinea. Cameroons: Cameroon Mountain, 9800–10800 ft., *Mann.*

Nile Land. Abyssinia: Tigre; Adowa, *Schimper,* 1063! Samen; Mount Silke, *Schimper,* 1302! Mount Bachit, *Schimper,* 757! and without precise locality, *Schimper!*

Cosmopolitan.

Var. *tenuifolia,* Hook. f. Fl. Antarct. ii. 334. Stolons usually absent. Leaves narrowly linear or subulate, terete or somewhat compressed, without dilated blade.—Journ. Linn. Soc. vi. 19; Hiern in Journ. Bot. 1901, 336, t. 426, fig. C, with synonymy, and in Dyer, Fl. Cap. iv. ii. 357. *L. tenuifolia,* Wolf. ex Hoffm. Deutschl. Fl. ed. 2, i. II. 29; Benth. in DC. Prodr. x. 427.

Upper Guinea. Fernando Po: top of Clarence Peak, 9000–10000 ft., *Mann*, 597!

Cosmopolitan.

2. **L. maior,** *Diels in Engl. Jahrb.* xxvi. 122. A tufted minutely glandular marsh herb much larger than *L. aquatica*. Leaves radical, crowded, oblong, spathulate-oblong or spathulate, subacute or obtuse, narrowed at the base, erect; blade usually $\frac{3}{4}$–$1\frac{3}{4}$ in. long and $\frac{1}{4}$–$\frac{2}{3}$ in. broad, broadest about the middle; petiole stout, $\frac{1}{2}$–4 in. long. Peduncles $\frac{3}{4}$–$2\frac{1}{2}$ in. long, erect in flower, deflexed in fruit. Calyx $1\frac{1}{2}$–2 lin. long; teeth deltoid-ovate, $\frac{1}{2}$ lin. long. Corolla lilac- or bluish-white; tube about 2 lin. long; lobes scarcely exserted, ovate-rounded. Capsule about $2\frac{1}{2}$ lin. long and 1 lin. broad.—Hiern in Dyer, Fl. Cap. iv. ii. 357.

Nile Land. Eritrea: Saganeiti; valley of Degerra, 7200 ft., *Schweinfurth & Riva*, 1260!

Also in South Africa.

L. aquatica, var. *alismoides*, Welw. ex Hiern in Cat. Afr. Pl. Welw. i. 766, collected by Welwitsch in Angola, is, according to Hiern, probably referable to *L. maior*.

3. **L. capensis,** *Thunb. Prodr.* 104. Very closely resembles *L. aquatica* in habit and foliage. Leaves ovate, elliptic-oblong or sub-linear; blade 1–8 lin. long, $\frac{1}{2}$–3 lin. broad; petioles very slender, up to 2 in. long or sometimes more. Peduncles 1-flowered, up to $1\frac{1}{4}$ (rarely to 2) in. long. Calyx $\frac{3}{4}$–1 lin. long, enlarged slightly in fruit; teeth broadly ovate. Corolla-tube about as long as or slightly longer than the calyx; lobes as long as or nearly as long as the tube, pilose and white on the upper side, purplish or pale blue with a white border on the underside. Capsule globose, $\frac{3}{4}$–1 lin. long.—Thunb. Fl. Cap. ed. Schult. 480; Benth. in DC. Prodr. x. 427; Hiern in Dyer, Fl. Cap. iv. ii. 358. *L. cœrulea*, Burch. Trav. S. Afr. i. 259, in note.

Lower Guinea. German South-west Africa: Great Namaqualand; Gobabis, *Schinz!* and without precise locality, *Chapman & Baines*.

Also in South Africa.

33. **SIBTHORPIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 959.

Calyx campanulate, 4–8- (usually 5-) fid; lobes somewhat unequal. Corolla subrotate; lobes as many as those of the calyx or one more, subequal, imbricate, spreading. Stamens as many as the corolla-lobes or one less; filaments short, filiform, subequal; anthers sagittate, with the cells contiguous and not confluent at the apex. Style short; stigma capitate. Capsule membranous, compressed, loculicidal. Seeds not numerous, convex on the back, flat or concave on the face, minutely tuberculate-rugose.—Prostrate creeping usually hairy herbs, often rooting at the nodes. Leaves alternate or fasciculate, petiolate, orbicular-reniform, coarsely crenate or incised-pinnatifid. Peduncles

axillary, solitary or fasciculate, ebracteate. Flowers yellow, yellow-rose, red or purple.

Species 6, also in Europe, India, Central and South America.

1. **S. europæa,** *Linn.*, var. **africana,** *Hook. f. in Journ. Linn. Soc.* vii. 208. A more or less pilose very slender prostrate creeping herb, often rooting at the nodes; stems up to 9 in. long. Leaves suborbicular, 2–9 lin. in diam., with numerous (often 15–20) very small crenate teeth; petiole $\frac{1}{4}$–$1\frac{1}{2}$ in. long. Peduncles solitary, 1–3 lin. long. Calyx about 1 lin. long, 4- or 5-lobed, conspicuously 4- or 5-nerved; lobes about $\frac{1}{3}$ lin. long, ovate, scarcely acute. Corolla yellow or sometimes purple, usually 5-lobed, about 1 lin. long. Stamens usually 4, included. Capsule broadly obovate, pilose at the apex, slightly emarginate, scarcely as long as the calyx.—Engl. Hochgebirgsfl. Trop. Afr. 379, and Pfl. Ost-Afr. C. 358. *S. africana*, Linn. Sp. Pl. ed. i. 631; Benth. in DC. Prodr. x. 428; A. Rich. Tent. Fl. Abyss. ii. 122. *Disandra africana*, Linn. Syst. ed. Reich. ii. 137.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1963! Fernando Po, 7500 ft., *Mann*, 1455!

Nile Land. Abyssinia: Samen; Mount Bachit, about 13,000 ft., *Schimper*, 1310!

Mozamb. Dist. German East Africa: Kilimanjaro; above Mamba, 8500 ft., *Volkens*, 785!

Also in the Azores, Balearic Isles, Greece and Crete.

Var. *glabra*, Skan. Plant quite glabrous.

Nile Land. Uganda: Ruwenzori; Butanuka, *Scott-Elliot*, 7848!

S. europæa is found in Western Europe, Madeira, Mexico and Peru.

34. **SCOPARIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 959.

Calyx 4- or 5-partite; segments ovate or lanceolate, imbricate. Corolla rotate, 4-fid, densely bearded at the throat; lobes imbricate, obtuse, subequal. Stamens 4, subequal; filaments filiform; anthers subsagittate, with parallel or divergent cells. Style slightly clavate at the apex; stigma truncate or emarginate. Capsule globose or ovoid. septicidal; valves entire, membranous. Seeds numerous, obovoid, angular, scrobiculate.—Glabrous or pilose very much branched herbs or small shrubs. Leaves opposite or verticillate, quite entire or dentate, punctate. Peduncles axillary, commonly in pairs, ebracteate. Flowers rather small, white, yellow or pale blue.

Species 6, natives of Tropical America, 1 dispersed throughout nearly all tropical countries.

1. **S. dulcis,** *Linn. Sp. Pl. ed.* i. 116. An erect slender much-branched undershrub 1–3 ft. high, glabrous or minutely hairy chiefly at the nodes; stem and branches obscurely angular. Leaves commonly ternate, sometimes in whorls of more than 3 or opposite, elliptic-lanceolate or lanceolate to linear-lanceolate, $\frac{1}{4}$–$1\frac{1}{2}$ in.

long, 1–5 lin. broad, obtuse or subacute, narrowed at the base into a short petiole, more or less distinctly serrate above the middle, densely punctate. Flowers solitary or geminate in the axils of the leaves, often forming many-flowered raceme-like inflorescences; peduncles 2–3 lin. long, very slender. Calyx about 1 lin. long, densely covered outside with sessile glands; segments 4, ovate, obtuse, sparingly ciliate, 3–5-nerved. Corolla $1\frac{1}{2}$ lin. long, white. Capsule ovoid, $1–1\frac{3}{4}$ lin. long.—Beauv. Fl. Owar. ii. 86, t. 115; Schumach. & Thonn. Beskr. Guin. Pl. 79; Benth. in DC. Prodr. x. 431; Oliver in Trans. Linn. Soc. xxix. 121; Henriques in Bolet. Soc. Brot. x. 144; Engl. Pfl. Ost-Afr. C. 358; Hiern in Cat. Afr. Pl. Welw. i. 766; Durand in Comptes-rendus Soc. Bot. Belg. xxiii. 115: Durand & Schinz, Études Fl. Congo, i. 211; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 45 and Reliq. Dewevr. 170; De Wild. Fl. Bas- et Moyen-Congo, i. 74; Hook. f. Fl. Brit. Ind. iv. 289. *S. ternata*, Forsk. Fl. Ægypt.-Arab. 31. *Capraria dulcis*, O. Kuntze, Rev. Gen. Pl. i. 459.

Upper Guinea. Gambia, *Ingram!* Sierra Leone, *Scott-Elliot*, 5134! *Vogel*, 20! *Welwitsch*, 5921! Gold Coast: Krobo plains, *Johnson*, 557! Liberia; Grand Bassa, *Vogel*, 47! Monrovia, *Whyte!* Lagos, *Dawodu*, 6! Ogbomoshaw, *Barter*, 3405! Togo: near Lome, *Warnecke*, 377! Northern Nigeria: Nupe, *Barter* 1174! Southern Nigeria: Nun River, *Vogel*, 16! Old Calabar, *Holland*, 17! 98! Cameroons: Bipinde, *Zenker*, 862! Johann-Albrechtshöhe, *Staudt*, 598!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, iii. 40! River Jur, *Schweinfurth*, 1578!

Lower Guinea. Island of St. Thomas, *Moller.* Rolas Island, *Quintas.* Princes Island, *Welwitsch*, 5922! Lower Congo, *Cabra;* near Leopoldville, *Gillet;* Boma, *Dewèvre.* Angola: various localities, *Welwitsch*, 5899! 5915! 5919, 5920; *Gossweiler.*

Mozamb. Dist. German East Africa: Unyamwezi; near Tabora, *Speke & Grant!*

Also in nearly all tropical countries, often as a weed on cultivated ground.

This plant is used as forage for horses and oxen in the Congo Free State.—*De Wild. Notices Pl. Utiles du Congo*, 549.

35. **CAPRARIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 959.

Calyx 5-partite; segments equal, narrow, scarcely imbricate. Corolla campanulate or subrotate, deeply 5-fid; tube short; lobes flat, imbricate. Stamens 4 or 5, shorter than the corolla, somewhat unequal; filaments filiform; anthers sagittate or almost horseshoe-shaped; cells divergent, confluent at the apex. Style short, dilated and almost 2-lobed at the apex. Capsule ovoid or ovoid-ellipsoid, bisulcate, loculicidal; valves at length 2-fid. Seeds numerous, small, attached to thick placentas, reticulate.—Glabrous or hairy perennial herbs or undershrubs. Leaves alternate, serrate. Peduncles axillary, ebracteate, usually geminate. Flowers white.

Species 4, natives of tropical and subtropical America.

1. **C. biflora,** *Linn. Sp. Pl. ed.* i. 628. A more or less pilose erect branched undershrub, 2–4 ft. high, with a creeping rootstock; stem

and branches terete. Leaves sessile, lanceolate or oblong-lanceolate, 1–3 in. long, $\frac{1}{4}$–$\frac{3}{4}$ in. broad, acute, narrowed at the base, coarsely serrate. Flowers usually geminate, sometimes solitary; peduncles 2–6 lin. long. Calyx $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long; segments linear-lanceolate, $1\frac{3}{4}$–2 lin. long, acute, pilose, sparingly punctate. Corolla $3\frac{1}{4}$–$3\frac{3}{4}$ lin. long; lobes oblong-elliptic, 2–$2\frac{1}{2}$ lin. long, acute. Capsule $2\frac{3}{4}$ lin. long, ovoid-ellipsoid, obtuse, slightly emarginate, punctate.—Benth in DC. Prodr. x. 429.

Upper Guinea. Gold Coast: Cape Coast Castle, *Vogel*, 79! Accra, *Brown*, 377!

Evidently an introduced plant in Africa. It is a native of Tropical America.

36. **VERONICA**, Linn.; Benth et Hook. f. Gen. Pl. ii. 964.

Calyx 4- or 5-partite; segments scarcely imbricate, the fifth posticous segment when present usually smaller. Corolla-tube short, rarely exceeding the calyx; limb spreading, 4- or 5-fid; lateral lobes outside (or one only outside); upper and lower lobes often narrower. Stamens 2, inserted on the corolla-tube at the sides of the upper lobe, exserted; anther-cells divergent or parallel, obtuse, confluent at the apex. Style subcapitate at the apex. Capsule compressed or turgid, 2-sulcate, loculicidal. Seeds few or many, ovate or orbicular, affixed by the inner flat or concave surface, smooth or rugulose on the back, often with a thickened or wing-like margin; embryo straight.—Herbs, shrubs or more rarely trees. Leaves opposite, more rarely verticillate or somewhat scattered. Flowers in terminal or axillary bracteate racemes, more rarely solitary in the axils of alternate leaves; pedicels ebracteolate. Corolla blue, purple, flesh-coloured or white, never yellow. Capsule very often obtuse or emarginate.

Species about 200, chiefly in the temperate and cold regions of both hemispheres: very few in tropical countries and America. Shrubby species are numerous in New Zealand.

Flowers in axillary racemes.
- Stem erect, stout; leaves sessile, semi-amplexicaul . 1. *V. Anagallis.*
- Stem more or less decumbent, often slender; leaves petiolate.
  - Plant glabrous or nearly so; leaves elliptic or elliptic-oblong . . . . . 2. *V. Beccabunga.*
  - Plant distinctly pubescent; leaves ovate to sub-orbicular.
    - Raceme more than 5-flowered; corolla scarcely 1 lin. long . . . . . 3. *V. javanica.*
    - Raceme 2–5-flowered; corolla 3–$3\frac{1}{2}$ lin. long . 4. *V. abyssinica.*

Flowers axillary and solitary or in crowded terminal racemes.
- Plant perennial, glandular-hairy; branches often 9–12 in. long.
  - Leaves shortly petiolate.
    - Leaves ovate or elliptic-ovate, $\frac{1}{2}$–$1\frac{1}{4}$ in. long; calyx 4-partite . . . . . 5. *V. glandulosa.*

Leaves elliptic or obovate, $\frac{1}{4}$–$\frac{1}{3}$ in. long; calyx 5-partite (the posticous segment minute) .	7. *V. myrsinoides.*
Leaves sessile, lanceolate or oblong-lanceolate .	6. *V. Mannii.*
Plant annual, not glandular-hairy, small.	
Stems prostrate; calyx subequally 4-partite, with narrow segments	8. *V. violæfolia.*
Stems ascending; calyx bipartite, with broad lobes	9. *V. simensis.*

1. **V. Anagallis,** *Linn. Sp. Pl. ed.* i. 12. A succulent glabrous or glandular-pubescent herb, 1–2 ft. high; stem creeping and rooting at the base, then erect, stout, hollow, branched. Leaves sessile, lanceolate, lanceolate-oblong or ovate-lanceolate, 1–3½ in. long, ¼–1¼ in. broad, usually acute, semi-amplexicaul, more or less remotely serrate or entire. Racemes 2–3½ in. long, in the axils of all or nearly all the upper leaves; bracts lanceolate or linear-lanceolate, 1–2½ lin. long; pedicels spreading, 1–2 lin. long. Calyx 1¼ lin. long; segments oblong-lanceolate, 1 lin. long, subacute. Corolla blue, pale blue or flesh-coloured, about 2 lin. in diam.; upper segment broadly ovate, 1 lin. long, nearly 1 lin. broad; lateral segments broadly elliptic, nearly 1 lin. long, ⅔ lin. broad; lower segment ¾ lin. long, scarcely ½ lin. broad. Capsule orbicular, slightly emarginate, 1–1¼ lin. long.—Fresen. in Bot. Zeit. 1844, 356; Benth. in DC. Prodr. x. 467; A. Rich. Tent. Fl. Abyss. ii. 125; Almagià in Ann. Istit. Bot. Roma, viii. 141; Hiern in Dyer, Fl. Cap. iv. ii. 367; Hook. f. Fl. Brit. Ind. iv. 293; Reichb. Ic. Fl. Germ. t. 1702; Oliver in Trans. Linn. Soc. xxix. 121; Schweinf. Beitr. Fl. Aethiop. 101 (var. *aquatica*). *V. aquatica*, Bernhardi, Ueber den Begriff der Pflanzenart, 66; Engl. Hochgebirgsfl. Trop. Afr. 379; Engl. Pfl. Ost-Afr. C. 358, and in Ann. Istit. Bot. Roma, vii. 26.

Nile Land. Ethiopia, *Kotschy*, 165! Nubia: New Dongola, *Ehrenberg*. Nile banks between Old Dongola and Korti, *Bromfield*, 108! Eritrea; Hamasen, *Steudner*, 817. Abyssinia: Tigre; Adowa, *Quartin-Dillon*, *Schimper*, 224; Dehli Dikeno, *Schimper*, 262; Memsach Region, 7200 ft., *Schimper*, 520; Samen, *Rüppell*; Ghaba, *Steudner*, 780! Hawash and Maki Rivers and Zaquala District, *Wellby!* Galla Country, *Steudner*, 776; and without precise locality, *Schimper*, 591! Uganda: Kidung Ndogo (Kedong River), 6800 ft., *Scott-Elliot*, 6501! British East Africa: Machakos, 4000–6000 ft., *Scott-Elliot*, 6681! Kikuyu and on the road to Eldama Ravine, 4000–6000 ft., *Whyte!*

Lower Guinea. German South-west Africa: Great Namaqualand; between Rehoboth and Otyizeva, *Schinz*, 5! and without precise locality, *Schinz*, 22!

Mozamb. Dist. German East Africa: Kilimanjaro, 6000 ft., *Johnston!* Usagara; Robeho Mountains, 4700 ft., *Speke & Grant!*

Also in nearly all warm and temperate regions.

I have seen no African specimen of *V. anagalloides*, Guss. Pl. Rar. 5, t. 3, which Almagià includes in his Flora of Eritrea (Ann. Istit. Bot. Roma, viii. 141). I suspect that the Eritrean specimens belong to *V. Anagallis*.

2. **V. Beccabunga,** *Linn.*, forma **minima,** *Engl. Hochgebirgsfl. Trop. Afr.* 379. A glabrous or sparingly puberulous herb; stems about 3 in. long, rather stout and succulent, decumbent and rooting in the lower part. Leaves shortly stalked, elliptic or elliptic-oblong, ½–¾ in. long, 2¾ lin. broad, subacute, narrowed at the base, rather fleshy,

obscurely few-toothed. Racemes axillary, about $\frac{3}{4}$ in. long, few-flowered; bracts linear-oblong, $1\frac{1}{2}$–2 lin. long, scarcely acute; pedicels somewhat shorter than the bracts. Calyx $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; segments oblong, obtuse. Corolla about $1\frac{1}{2}$ lin. long. Capsule suborbicular, slightly shorter than the calyx.—*V. Beccabunga*, var., A. Rich. Tent. Fl. Abyss. ii. 125.

Nile Land. Abyssinia: Samen; Mounts Deggen and Bachit, 13000–14000 ft., *Schimper*, 1271!

The typical form is widely spread in Europe and Asia.

3. **V. javanica,** *Blume*, *Bijdr.* 742. A slender diffusely branched decumbent or ascending herb usually about 6 in. high, more or less grey-pilose. Leaves petiolate or the upper subsessile, broadly ovate, 5–12 lin. long, 5–10 lin. broad, obtuse, truncate-cuneate or sometimes slightly cordate at the base, coarsely crenate-serrate; petiole $\frac{1}{2}$–4 lin. long. Racemes axillary, about 1 in. long in flower, up to 2 (rarely 3) in. long in fruit; bracts oblong-lanceolate, 2 lin. long, obtuse; pedicels $\frac{1}{2}$–$\frac{3}{4}$ lin. long. Calyx $1\frac{1}{4}$ lin. long in flower, up to $2\frac{1}{4}$ lin. long in fruit; segments oblong, obtuse. Corolla scarcely 1 lin. long, pale blue. Capsule broadly obcordate, $\frac{2}{3}$–$\frac{3}{4}$ as long as the calyx, ciliate.—Benth. in DC. Prodr. x. 489; Hook. f. Fl. Brit. Ind. iv. 296. *V. wogerensis*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 126; Almagià in Ann. Istit. Bot. Roma, viii. 141. *V. chamædryoides*, Engl. Pfl. Ost-Afr. C. 358; Engl. in Engl. Jahrb. xxiii. 505, and in Ann. Istit. Bot. Roma, vii. 26, not of Bory & Chaub. *V. Maddeni*, Edgew. ex Hook. f. Fl. Brit. Ind. iv. 296.

Nile Land. Eritrea: Saganeiti, 7200 ft., *Schweinfurth & Riva*, 1369! Amasen; Belesa, 7200 ft., *Terracciano & Pappi*, 324ft. Abyssinia: Wogara, *Schimper*, 730! and without precise locality, *Schimper*, 218! Somaliland: near Coromma, *Riva*, 613. Uganda: Kidung Ndogo (Kedong River), *Scott-Elliot*, 7045! British East Africa: Ukamba; Machakos, *Scott-Elliot*, 6678!

Mozamb. Dist. German East Africa: Kilimanjaro; near Marangu, 4900–5100 ft. *Volkens*, 585! 760.

Also in India, Siam, Java, Tonquin and the Luchu Islands.

4. **V. abyssinica,** *Fresen. in Bot. Zeit.* 1844, 356. A prostrate herb diffusely branched from the base, sometimes rooting at the nodes, more or less pilose (often bifariously on the branches); branches usually 9–12 in. long, herbaceous or sometimes becoming almost woody, hollow. Leaves petiolate, ovate, elliptic-ovate or rarely suborbicular, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad (rarely $1\frac{1}{2}$–2 in. long, 1–$1\frac{1}{4}$ in. broad), obtuse or subacute, rounded, slightly cordate, truncate or somewhat cuneate at the base, crenate-serrate (often coarsely) or crenate, more or less pilose on both sides or sometimes almost glabrous; petiole usually about 3 (rarely up to 6) lin. long. Racemes 1–$2\frac{1}{2}$ in. long, often 2- (sometimes up to 5-) flowered; bracts linear-oblong, $1\frac{3}{4}$–3 lin. long, obtuse; pedicels 2–4 lin. long. Calyx 2–$2\frac{1}{2}$ lin. long in flower, 3–$3\frac{1}{2}$ lin. long in fruit; segments oblong, elliptic-oblong or spathulate-elliptic, obtuse, ciliate and sometimes pilose inside and outside. Corolla 3–$3\frac{1}{2}$ lin. long, cobalt-blue (pinky-white, *Johnston*). Style 1–$1\frac{1}{2}$ lin. long. Capsule obovate, com-

pressed, pilose or rarely glabrous, $\frac{1}{2}$–$\frac{2}{3}$ lin. shorter than the calyx.—A. Rich. Tent. Fl. Abyss. ii. 127; Benth. in DC. Prodr. x. 490; Engl. Hochgebirgsfl. Trop. Afr. 379; Engl. Pfl. Ost-Afr. C. 358; Engl. in Ann. Istit. Bot. Roma, vii. 26. *V. petitiana*, A. Rich. Tent. Fl. Abyss. ii. 127. *V. africana*, Hook. f. in Journ. Linn. Soc. vii. 208. *V. montana*, Avetta in Ann. Istit. Bot. Roma, vi. 59, not of Linn. f.

Upper Guinea. Cameroons: Cameroon Mountain, 7000 ft., *Mann*, 1263! 1997! 7000–9000 ft., *Johnston*, 15!

Nile Land. Abyssinia: Tigre; Wojerat, *Petit*; Samen, *Rüppell*; Begemeder: Reb Valley, 7500 ft., Debra Tabor, and Jan-Meda, 9100 ft. *Schimper*, 1154! Shea; *Quartin-Dillon*; Ankober, *Roth*, 467! Antoto, *Ragazzi*; and without precise locality, *Schimper*, 462! Somaliland: between Harar and Addis-Albeba, *Wellby!* between Biddume and Alghe, *Riva*, 1248. Uganda: various localities between Nandi and Mau Plateau, 6000–9000 ft., *Whyte!* Mau; Masai River, 6000 ft., *Scott-Elliot*, 6795! *Johnston!* Ruwenzori; Kasamaga (? Kasagama), 5300 ft., *Scott-Elliot*, 7600!

Mozamb. Dist. German East Africa: Kilimanjaro, 4900–8900 ft., *Volkens*, 732! 1336!

We have followed Engler in uniting *V. petitiana* and *V. africana* with *V. abyssinica*. Though this seems the best course, it should be noted that some slight differences can be detected between the material from the Cameroons (*V. africana*) and that from Eastern Africa. In the former the petioles are usually longer, the leaves have smaller teeth, the flowers are said by Johnston to be pinky-white, and the style is shorter. Moreover, two of the Abyssinian specimens (Schimper, 1154) named *V. petitiana* at Kew, differ from the rest of the East African material in having shorter petioles, suborbicular crenate leaves, and broader calyx-segments. These hardly agree with Richard's description of *V. petitiana*. An examination of the types of *V. abyssinica* and *V. petitiana*, which are not accessible to us, might suggest that the plant from the Cameroons and the doubtful Abyssinian one should constitute two varieties of *V. abyssinica*.

5. **V. glandulosa,** *Hochst. ex Benth. in DC. Prodr.* x. 482. A perennial glandular-pilose or sometimes nearly glabrous herb; stems creeping and rooting and much branched at the base, then ascending; branches leafy, elongated, usually bifariously pilose. Leaves very shortly petiolate, ovate or sometimes elliptic-ovate, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $2\frac{1}{2}$–8 lin. broad, obtuse, rounded or cuneate at the base, minutely and sparingly serrate, glabrous or sparingly glandular-pilose. Flowers solitary in the axils of the upper leaves; pedicels 1–$1\frac{1}{2}$ lin. long, glandular-pilose. Calyx $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, more or less glandular-pilose, 4-partite; upper segments oblong, $1\frac{3}{4}$ lin. long, obtuse; lower broadly oblong, $2\frac{1}{4}$ lin. long, obtuse. Corolla $2\frac{3}{4}$ lin. long. Style 1–$1\frac{1}{2}$ lin. long. Capsule obcordate, compressed, very sparingly glandular-ciliate, $\frac{1}{2}$–$\frac{3}{4}$ lin. shorter than the calyx.—A. Rich. Tent. Fl. Abyss. ii. 125; Schweinf. Beitr. Fl. Aethiop. 101; Engl. Hochgebirgsfl. Trop. Afr. 380.

Nile Land. Abyssinia: Demerki, *Schimper*, 568! 1149! Mount Silke *Schimper*, 198; Mount Guna, 10000–11000 ft., *Schimper*, 1460! and without precise locality, *Schimper*, 1052!

6. **V. Mannii,** *Hook f. in Journ. Linn. Soc.* vi. 19. A glandular-pilose perennial herb; stems creeping and rooting at the base, then

ascending or erect, about 9 in. high, branched; branches bifariously pilose, often very densely leafy above. Leaves sessile, lanceolate or oblong-lanceolate, 6–9 lin. long, 1½–3¼ lin. broad, obtuse, somewhat narrowed at the base, sparingly glandular-pilose or glabrous, serrulate or sometimes nearly entire, rather coriaceous. Flowers in short crowded terminal racemes; pedicels about ¾ lin. long; bracts elliptic-lanceolate to oblong, shorter than the flowers. Calyx 4-partite, densely glandular-pilose, 3 lin. long; segments oblong, obtuse. Corolla blue, 4–4¾ lin. long; tube 1½–1⅔ lin. long; lobes obovate-ovate or suborbicular. Style 1½ lin. long. Capsule obcordate, compressed especially at the apex, shortly glandular-pilose, ¼–⅔ lin. shorter than the calyx.—Engl. Hochgebirgsfl. Trop. Afr. 380.

Upper Guinea. Cameroons: Cameroon Mountain, 9000–13500 ft., *Mann*, 1312! 2030! *Johnston*, 52! Fernando Po: Clarence Peak, *Mann*, 604!

7. **V. myrsinoides,** *Oliv. in Hook. Ic. Pl. t.* 1509. A perennial herb; stems creeping, slender, 6–12 in. long, simple in the specimen seen, rather densely leafy, bifariously shortly pilose. Leaves very shortly petiolate, elliptic or obovate, 3–4 lin. long, 1¼–1½ lin. long, obtuse, minutely 2–4-toothed near the apex on each side, glabrous, more or less coriaceous; petiole 1 lin. long or less. Flowers solitary in the axils of the uppermost leaves; pedicels glandular-pilose, 1¼ lin. long. Calyx about 2 lin. long, 5-partite; posticous segment minute, the other 4 oblong or oblong-spathulate, about 1½ lin. long, obtuse, glandular, pilose. Corolla pale blue, 3–4 lin. long; lobes obovate, the posticous broader than the others. Style 1⅔ lin. long. Capsule obcordate, about ½ lin. shorter than the calyx, sparingly glandular-ciliate.—Trans. Linn. Soc. ser. 2, Bot. ii. 343; Engl. Hochgebirgsfl. Trop. Afr. 380; Engl. Pfl. Ost-Afr. C. 358.

Mozamb. Dist. German East Africa: Kilimanjaro, 11000 ft., *Johnston*, 144! *Meyer*, 143.

8. **V. violæfolia,** *Hochst. ex Benth. in DC. Prodr.* x. 488, *excl. syn.* A small slender diffusely branched prostrate pilose annual; branches ¾–3 in. long. Leaves petiolate, ovate to broadly obovate-cuneate, 1½–2 lin. long and broad, fleshy, crenate-serrate, obtuse, the lower opposite, the upper alternate; petiole 1½–2 lin. long, broadest at the top. Flowers axillary, solitary; peduncles slender, 1½–3 lin. long. Calyx 2 lin. long, 4-partite; segments spathulate-oblong to obovate, obtuse. Corolla about 1 lin. long; segments suborbicular, the lowest much smaller than the others. Style scarcely ½ lin. long. Capsule obcordate, compressed, shortly pilose, very slightly shorter than the calyx.—A. Rich. Tent. Fl. Abyss. ii. 126; Engl. Hochgebirgsfl. Trop. Afr. 380; Almagià in Ann. Istit. Bot. Roma, viii. 141.

Nile Land. Eritrea: Amasen; Ginda Baresa, 3300 ft., *Terracciano & Pappi*, 63. Abyssinia: Samen; upper region of Mount Bachit, *Schimper*, 984!

9. **V. simensis,** *Fresen. in Bot. Zeit.* 1844, 356. A sparingly grey-pilose slender annual 2½–4 in. high, branched from the base;

branches decumbent. Leaves opposite or the upper alternate, shortly petiolate, ovate or ovate-orbicular, 3–5 lin. long, 3–4½ lin. broad, truncate, rounded or slightly cuneate at the base, serrate or serrate-crenate chiefly from the middle to the apex, prominently 5-nerved on the underside; petiole ½–1½ lin. long. Flowers axillary, solitary; peduncles very slender, 2–5½ lin. long. Calyx scarcely more than 1 lin. long in flower, up to 2½ lin. long in fruit, divided in the median plane into 2 deeply bifid ciliate segments which are slightly cordate at the base; lobes acute, entire or 1- or 2-toothed. Corolla about ¾ lin. long; upper and lateral segments elliptic, broader than the lower segment. Style scarcely ¼ lin. long Capsule suborbicular, very much compressed, emarginate, ciliate, 1¾ lin. long, 2 lin. broad. Seeds cochleate, rugose, about ⅔ lin. in diam.—Flora, 1851, 659.

Nile Land. Eritrea: near Saganeiti, 7200 ft., *Schweinfurth & Riva*, 806! Abyssinia: Samen, *Rüppell;* and without precise locality, *Schimper*, 335!

V. filiformis, A. Rich. *Tent. Fl. Abyss.* ii. 127, from Mount Sholoda, near Adowa, in Abyssinia, *Quartin-Dillon*, we have not seen, but we suspect that it is the same as the above species, though the peduncles are said to be much longer. The description will not do for *V. filiformis*, Smith, a species from the Caucasus and Asia Minor, with which Richard identified it.

Imperfectly known species.

10. **V. Gunæ,** *Schweinf. in Engl. Hochgebirgsfl. Trop. Afr.* 380.

Nile Land. Abyssinia: on Mount Guna, at the source of the Reb River, 10800 ft., *Steudner*, 811.

Allied to *V. glandulosa* and *V. Mannii*. The branches are decumbent, with small shortly stalked roundish-obovate leaves.

37. MELASMA, Berg.; Benth. et Hook. f. Gen. Pl. ii. 966.

Calyx campanulate, 10-ribbed, 5-lobed, enlarged, inflated and dry in fruit, angular; lobes erect, equal, valvate. Corolla tubular-campanulate, much longer than the calyx, not marcescent, 5-lobed; lobes imbricate. Stamens 4, didynamous or nearly equal, included; anther-cells parallel, distinct, apiculate or acuminate. Disk annular, fleshy. Ovary glabrous. Style clavate or flattened, persistent, exserted from the calyx. Capsule included in the calyx, loculicidal. Seeds very numerous, linear-cuneate or clavate, straight or curved, truncate at the unequal ends, 1–1½ lin. long; outer testa transparent, very coarse-celled, about three times as long as the nearly central nucleus.—Coarse, hispid or hairy, erect, apparently not parasitic herbs, 2 or 3 ft. high. Leaves opposite, or alternate in the inflorescence, sessile or nearly so, entire or toothed, usually larger than in the leafy species of *Alectra*. Inflorescence usually loose. Flowers relatively large, solitary in the axils of the leaves or bracts, distinctly pedicellate; pedicels often long; bracteoles 2, variously placed.—*Velvitsia,* Hiern in Cat. Afr. Pl. Welw. i. 771.

Species 5, 1 in South Africa, 3 in Tropical America.

The author of *Velvitsia* does not point out its differential characters, but he places it next *Bopusia* (*Graderia*). We can only regard *V. calycina* as a congener of *Melasma scabrum*, which has quite the same kind of calyx in the fruiting stage. It is perhaps open to question whether *Melasma rhinanthoides*, Benth., should be retained in the genus. See the remarks under *Alectra*.

1. **M. calycinum,** *Hemsl.* An erect, perennial herb, scabrid in nearly all parts. Rootstock woody. Stems 1½ to 2 ft. high, rigid, straight, angular, sparingly branched. Leaves opposite or upper ones alternate, very shortly stalked, thin, very rigid, strongly veined, lanceolate or oval-oblong, 1½–3 in. long, obtuse or rounded at the tip, more or less narrowed towards the base, very rough, remotely denticulate. Inflorescence ½ to 1 ft. long; lower pedicels about 1 in. long, shorter upwards. Floral leaves or bracts nearly 2 in. long, smaller upwards. Bracteoles narrow about as long as the calyx and close under it. Calyx about 9 lin. long in fruit, hemispherical, inflated, 10-nerved, net-veined, scabrid; lobes deltoid, acute. Corolla verging on pale yellow, veined with violet. Capsule oval, pointed, compressed. Seeds about ⅛ in. long.—*Velvitsia calycina*, Hiern in Cat. Afr. Pl. Welw. i. 771.

Lower Guinea. Huilla: in moist thickets near Ohai, towards Lopollo, 5000 ft., *Welwitsch*, 1263 !

Description partly from Hiern, who states that the chief part of it was taken from Welwitsch's notes.

38. **ALECTRA**, Thunb.; Benth. et Hook. f. Gen. Pl. ii. 966.

Calyx campanulate, not enlarged in fruit, 10-nerved or 10-ribbed, equally nearly 5-lobed; lobes usually about as long as the tube, acute. Corolla very thin, longitudinally veined, early marcescent, persistent within the calyx around the ripe capsule, narrowly campanulate, slightly oblique, usually not more than a third longer than the calyx, nearly equally 5-lobed; lobes rounded, recurved during the short period of expansion, then tightly twisted up. Stamens 4, didynamous, sometimes nearly equal, attached below the middle of the corolla, included; filaments all bearded or only the two longer ones, or all glabrous; anthers connivent or convergent in pairs; cells equal or unequal, apiculate or obtuse. Ovary glabrous; style clavate above the middle, recurved, rolled up with the stamens in the persistent corolla. Capsule globose or compressed, included in the calyx, loculicidal. Seeds very numerous, linear-cuneate or clavate, straight or curved, truncate at the ends, about ½–1 lin. long; outer testa transparent, very coarse-celled, about six times as long as the ovoid or conoid, nearly central nucleus.—Annual or perennial, erect, usually hispid herbs, parasitical on the roots of other plants, often almost leafless, and turning black in drying. Stems simple or branched. Leaves opposite or alternate, small, sessile or shortly stalked, entire or toothed. Inflorescence usually dense. Flowers small, usually yellow, veined with brown or red, solitary in the

axils of the leaves or bracts, sessile or very shortly stalked, with two small bracteoles close under the calyx.

Species many, the others in Madagascar, Tropical Asia and South America.

Several recent writers on the *Scrophulariaceæ* have reduced *Alectra* to *Melasma*, without, so far as we know, discussing the reasons. *Alectra* was founded on *A. capensis*, Thunb., which has subsessile flowers; a calyx that does not become inflated in fruit; a striped, marcescent, persistent corolla, and a clavate, recurved style. Apparently all the species of *Alectra*, as here limited, are root-parasites. *Melasma* was founded on the South African *M. scabra*, Berg., which has distinctly stalked flowers; the calyx grows out very much in fruit; the corolla is early deciduous, and the style is exserted from the calyx. The American species presents most of the same characteristics. It is true, however, that the distinctive characters given are not always all constant; but it seems better to follow Bentham in retaining both genera. With the exception of *A. capensis*, the species of *Alectra* have relatively much smaller flowers than those of *Melasma*; and it is impossible to give the shape of the corolla, and only approximately its size, from dried specimens. Apparantly the expansion is of very short duration, when it shrivels and twists up, enclosing the stamens and style.

The species of *Melasma* are not any of them root-parasites so far as we can tell.

Although we have taken a different view from previous writers of the limits of some of the species of *Alectra*, we are not satisfied that we have always arrived at correct conclusions. The following key leaves much to be desired, but it is the best we could make from the materials, which in several instances consist of a single imperfect specimen.

* Almost leafless; drying black.
  Filaments bearded; anther-cells not apiculate.
    Dwarf fleshy-coloured stems; leaves reduced to small scales.
      Plant deep crimson calyx-lobes apiculate . 1. *A. atrosanguinea.*
      Plant orange-purple; calyx-lobes obtuse . 2. *A. Welwitschii.*
      Plant purple-red; calyx-lobes obtuse . . 3. *A. Bainesii.*
    A foot or more high bearing few small leaves.
      Stems simple or branching only from the base.
        Slender; flowers few, relatively small . 4. *A. kilimandjarica.*
        Robust; flowers numerous, relatively large . 5. *A. parvifolia.*
      Stems bearing a number of slender branches near the middle . . . . . 6. *A. Kirkii.*
  Filaments glabrous; anther-cells obtuse.
    A foot or more high, bearing few, small leaves.
      Stems angular.
        Leaves less than 1 in. long . . . 7. *A. parasitica.*
        Leaves more than 1 in. long . . . 8. *A. hirsuta.*
      Stems terete . . . . . 9. *A. hippocrepandra.*

** Leafy.
  Anther-cells not apiculate.
    Filaments bearded.
      Stems simple; leaves linear-lanceolate, acuminate . . . . . 10. *A. lancifolia.*
      Stems slender, branched; leaves elliptic, or lanceolate-obtuse . . . . . 11. *A. picta.*

Filaments glabrous.
Stems relatively stout, much-branched from the base; branches erect; leaves oblong-lanceolate, not acuminate . . . 12. *A. Vogelii.*
Anther-cells apiculate.
Very hispid; hairs tuberculate.
Stems rigid, erect; leaves spreading . . 13. *A. asperrima.*
Stems rigid, erect; leaves fleshy, adpressed . 14. *A. rigida.*
Stems very short and slender; leaves sessile, less than ½ in. long . . . . 15. *A. virgata.*
Very dwarf, branching from the base: leaves more than ½ in. long . . . . 16. *A. aurantiaca.*
Very hispid; hairs not tuberculate; stems long, weak; leaves oblong-lanceolate . . . 17. *A. trinervis.*
Hairy or slightly hispid.
Stems usually simple, slender, usually less than a foot high.
Leaves lanceolate to orbicular, obscurely toothed . . . . . 18. *A. senegalensis.*
Leaves cordate, obscurely toothed . . 19. *A. cordata.*
Stems rigid, usually more than a foot high; leaves coarsely toothed.
Stems simple or with few, erect branches; leaves sessile, cordate-ovate, adpressed 20. *A. melampyroides.*
Stems much branched; leaves stalked, oblong-lanceolate, spreading . . 21. *A. communis.*

1. **A. atrosanguinea,** *Hemsl.* An annual root-parasite, about 7 in. high. Root orange or dark crimson. Stem branched, glabrate, orange, soon turning dark crimson at the base. Leaves few, small, scale-like, rather fleshy, deep crimson. Flowers in terminal spikes. Spikes about 2 in. long, erect; bracts shorter than the flowers. Calyx broadly campanulate, somewhat hispid, 10-nerved, deep crimson, shortly 5-lobed, about ¼ in. long; lobes broadly ovate-triangular, apiculate. Corolla nearly rotate, scarcely exceeding the calyx, orange-yellow; lobes 5, somewhat spreading, obtuse. Stamens inserted at the base of the corolla, nearly equal; filaments glabrous or (according to *Welwitsch*) pilose, not densely bearded.—*Melasma atrosanguineum*, Hiern in Cat. Afr. Pl. Welw. i. 769.

Lower Guinea. Angola: Pungo Andongo; in thickets between Sansamanda and Caghuy, *Welwitsch*, 5853!

This species was founded upon a fragment, which looks different from anything else we have seen. The description is from Hiern.

2. **A. Welwitschii,** *Hemsl.* A parasitic, brown, leafless, puberulous, herb like a broomrape. Rhizome thick, fleshy, yellow inside. Stem simple or slightly branched, 4–7 in. high, bearing a few obtuse scales less than ¼ in. long, and florescent in the upper quarter, orange-purple at the base, dusky purple upwards. Flowers orange, densely crowded, nearly sessile. Bracts oblong, obtuse, shorter than the flowers. Bracteoles subulate, about $\frac{1}{12}$ in. long. Calyx campanulate,

about ¼ in. long, dusky purple, nearly equally 5-lobed; lobes lanceolate-oblong, rather obtuse, shorter than the tube. Corolla about ½ in. long, longitudinally striate; tube very short, not constricted; limb 5-lobed; lobes spathulate, somewhat concave, spreading. Filaments densely bearded; anther-cells not apiculate.—*Melasma Welwitschii*, Hiern in Cat. Afr. Pl. Welw. i. 769.

Lower Guinea. Angola: Mossamedes; in sandy places by the River Bero, near Cavalheiros, *Welwitsch*, 5812!

Description partly from Hiern.

3. **A. Bainesii,** *Hemsl.* A parasitic almost leafless, nearly glabrous herb about 6 in. high, turning black in drying. Stem of the only specimen seen having two lateral branches; scales few and very small. Flowers small, crowded on the upper half of the stem, subsessile. Bracts ovate, obtuse, 3–4 lin. long. Bracteoles oblong-spathulate, shorter than the calyx, obtuse. Calyx hispid, campanulate, nearly equally 5-lobed, about 4 lin. long; lobes deltoid, obtuse, shorter than the tube. Corolla glabrous, 4–5 lin. long, deeply 5-lobed; lobes spathulate, rounded at the top, undulate, strongly veined, three times as long as the tube, the two upper larger than the others. Stamens nearly equal; filaments very short, bearded close under the anthers; anther-cells oblong, slightly unequal, obtuse.

Mozamb. Dist. Bechuanaland: Ngamiland; Koobie (Kobis) to North Shaw Valley, *Baines!*

4. **A. kilimandjarica,** *Hemsl.* An almost leafless, puberulous, slightly hispid root-parasite, changing black in drying. Stems slender, erect, puberulous, 5–15 in. high, few-flowered, simple or with two or three erect branches from near the base. Leaves mostly scale-like and very small, hispid, largest ½ in. long, lanceolate-oblong, obtuse, obscurely toothed. Racemes loose when fully grown out. Floral leaves or bracts oblong-lanceolate, obtuse, shorter than the almost sessile flowers. Bracteoles linear, shorter than the calyx, persistent. Calyx hispid, about ¼ in. long, 10-ribbed, nearly equally 5-lobed; lobes triangular, rather obtuse, more hairy on the margin, posterior largest. Corolla about twice as long as the calyx, nearly equally 5-lobed; lobes rounded, shorter than the tube, 3-veined. Stamens nearly equal, inserted near the middle of the tube; filaments slender, slightly bearded; anthers nearly equal and parallel. Ovary glabrous; style clavate, recurved.—*Melasma orobanchoides*, Engl. Pfl. Ost-Afr. C. 359.

Mozamb. Dist. German East Africa: Usambara; Amboni, *Holst*, 2803! Lake Chala, *Volkens*, 325!

This may possibly prove not to be specifically different from *A. orobanchoides*, Benth., but we prefer to avoid further confusion. The type of the latter is different in aspect, has smaller flowers, and relatively shorter bracteoles, and there may be other differences which better material would bring to light.

Under the name of *Alectra orobanchoides* (*Melasma orobanchoides*, Engler) botanists have included about half a dozen forms which we regard as distinct species. *A. orobanchoides*, Benth. (DC. Prodr. x. 340) was founded on specimens collected

by Drège, near Durban, at an elevation of less than 100 ft. It has slender, simple stems (or is only branched from the base), bearing few, very small flowers ; besides presenting other differences. The only other specimen we have identified with this species is Galpin's No. 847, from near Barberton, Transvaal, at an elevation of 2800–3000 ft. Among the extratropical South African specimens referred to *A. orobanchoides* there are perhaps one or two other distinct species. *A. pumila*, Benth., from numerous localities, is uniformly dwarf and tufted. The Abyssinian *A. parasitica*, Rich., which has also been referred to *A. orobanchoides*, differs entirely in habit and in having glabrous filaments.

5. **A. parvifolia,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. (1890) 195. An almost leafless, hispid root-parasite, changing black in drying. Stems simple or slightly branched from near the base, sometimes clustered, about a foot high. Leaves few, distant, opposite in the lower part of the stem, but mostly alternate, sessile, rather thick, ovate-oblong, largest about $\frac{1}{4}$ in. long, obtuse. Flowers numerous, crowded, distinctly pedicellate ; lower pedicels $\frac{1}{4}$ in. long. Bracts similar to the leaves, shorter than the flowers. Bracteoles filiform, about half as long as the calyx. Calyx hispid, about 3–4 lin. long, 10-costate, nearly equally 5-lobed ; lobes ovate, obtuse, hairy on both sides. Corolla $\frac{1}{2}$ in. or more across, 15-nerved ; lobes nearly equal, rounded. Stamens nearly equal ; filaments all strongly bearded ; anther-cells nearly equal, slightly oblique, obtuse.—*Celsia parvifolia*, Engl. Jahrb. x. 252.

Lower Guinea. Angola : Ambriz, *Monteiro !* Damaraland : near Usakos, 3000 ft. *Marloth*, 1273 ! Upingtonia, *Schinz*, 12 !

Specimens collected in Ngamiland by Mrs. Lugard, 186, and Captain E. J. Lugard, 171, may also belong to this species.

6. **A. Kirkii,** *Hemsl.* An erect, almost leafless, or slightly hispid pubescent, parasitic herb, changing black in drying. Stem 1–2 ft. high, straight, $\frac{1}{4}$–$\frac{1}{3}$ in. thick at the base, usually bearing a few slender, short branches about the middle, floriferous two-thirds of its length. Leaves few, alternate, mostly scale-like ; lower adpressed, rounded ; upper narrow, lanceolate, somewhat acute, longest about $\frac{1}{2}$ in. Flowers numerous but not overlapping ; lower distinctly pedicellate. Bracts similar to the leaves, adnate to the base of the pedicels, shorter than the flowers. Bracteoles linear, shorter than the calyx, persistent. Calyx thin, hispid, less than $\frac{1}{4}$ in. long, 10-nerved, almost equally 5-lobed ; lobes deltoid, scarcely acute, shorter than the tube. Corolla less than $\frac{1}{2}$ in. long. Filaments all hairy ; anther-cells nearly equal, obtuse.

Mozamb. Dist. German East Africa : Usambara, *Scheffler*, 131 ! Umba Valley, *Smith !* Zambesi Delta : Kongone River, *Kirk !* British Central Africa : Nyasaland ; Plateau of Mount Zomba, 5000–6000 ft., *Whyte !*

This is one of several species that have been referred to *A. orobanchoides*, Benth., from which it is quite different in habit and larger flowers.

7. **A. parasitica,** *A. Rich. Tent. Fl. Abyss.* ii. 117. An almost leafless root-parasite, changing black in drying. Stems slender, erect,

puberulous, 8–16 in. high, flowering part 3–9 in. long; branches few from near the base, erect. Leaves mostly scale-like and very small, hispid, largest $\frac{1}{3}$ in. long, lanceolate-oblong, acute. Racemes rather loose. Floral leaves or bracts linear, acute, shorter than the shortly pedicellate flowers. Bracteoles subulate, $\frac{1}{3}$–$\frac{1}{2}$ the length of the calyx, persistent. Calyx slightly oblique, $\frac{1}{4}$ in. long, 10-ribbed, nearly equally 5-lobed; lobes shorter than the tube, deltoid, acute. Corolla about $\frac{1}{2}$ in. long, glabrous; lobes nearly equal, rotundate, rather longer than the tube, 3-veined. Stamens nearly equal; filaments short, slender, glabrous; anther-cells slightly unequal, parallel, obtuse.—*Glossostylis parasitica*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 117.

Nile Land. Abyssinia: Tacazze Valley, *Schimper*, 1464!

This has also been referred by some botanists to *A. orobanchoides*, Benth.

8. **A. hirsuta,** *Klotzsch in Peters, Reise Mossamb. Bot.* 221. Herbaceous, erect, hispid in nearly all parts. Stem short, angular as well as the branches. Leaves opposite, or alternate in the inflorescence, sessile, rigid; lower oblong, obtuse, nearly entire, narrowed to the base, $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide; upper lanceolate, $\frac{2}{3}$ to $1\frac{1}{4}$ in. long, $\frac{1}{6}$ to $\frac{1}{3}$ in. wide, subacute, sparsely toothed. Flowers solitary in the axils of the upper leaves or bracts, pedicellate. Bracteoles leaf-like, narrow, oblong. Calyx obliquely campanulate, 5-lobed; lobes ovate, somewhat obtuse. Corolla globose, campanulate, bright yellow veined with purple; limb obliquely 5-lobed with obtuse lobes. Stamens and style included. Ovary glabrous. Valves of the open capsule bifid.

Mozamb. Dist. Portuguese East Africa: Sena, *Peters*.

We have seen no authenticated specimens of this species, but Gossweiler's 666 from Cazengo, Angola, may perhaps belong to it.

9. **A. hippocrepandra,** *Hemsl.* An erect, branched or simple, green parasitic hispid herb, 1–2 ft. high. Root tuberous with orange-cinnabar rootlets. Lower leaves scale-like ovate. Stem-leaves nearly sessile, opposite or alternate, ovate or oblong, the largest 1 in. long by $\frac{1}{2}$ in. broad, usually with a few small teeth on each side. Flowers nearly sessile, solitary in the axils of alternate bracts, in dense terminal racemes, 6 in. long, or more. Bract lanceolate, obtuse, longer than the calyx. Bracteoles 2, minute. Calyx hispid, campanulate, about $\frac{1}{4}$ in. wide and long, nearly equally 5-lobed; lobes triangular. Corolla glabrous, longitudinally striate, not much longer than the calyx; tube not distinctly constricted at the top; limb oblique, of 5 spreading spathulate lobes. Stamens 4, included; filaments filiform, glabrous; anther-cells obtuse, horseshoe-shaped, pilose on the back. Ovary globose, glabrous; style thicker, clavate, recurved.—*Melasma hippocrepandrum*, Hiern in Cat. Afr. Pl. Welw. i. 768.

Lower Guinea. Angola: Golungo Alto; infecting crops of *Arachis, Welwitsch*, 5900!

Description mainly from Hiern.

10. **A. lancifolia,** *Hemsl.* An "annual," erect, slightly hispid

herb, 1–1½ ft. high. Stems slender, straight, unbranched. Leaves opposite, or alternate in the inflorescence, shortly stalked, linear-lanceolate, 1–1¾ in. long, ⅙–⅓ in. wide, scarcely acute, 3-nerved, entire or furnished with a few small teeth, longer than the internodes. Flowers "yellow;" floral-leaves or bracts shorter than the calyx, linear or almost filiform; bracteoles much longer than the flowers. Calyx thin, campanulate, ¼–⅓ in. long, 10-ribbed, nearly equally 5-lobed, setulose on the ribs and margin; lobes deltoid, acuminate, acute, as long as the tube. Corolla about ½ in. long, longitudinally 15-nerved, not net-veined. Stamens nearly equal; longer filaments strongly bearded; anther-cells nearly equal, obtuse.—*Melasma indicum*, Hiern in Cat. Afr. Pl. Welw. i. 767, but not *Alectra indica*, Benth.

Lower Guinea. Angola: Pungo Andongo; in moist plantations of Manioc, near Calunga, *Welwitsch*, 5849!

11. **A. picta,** *Hemsl.* An annual, parasitic, erect, hispid herb, 4–12 in. high. Rootlets of rhizome bright orange. Stem branching from the orange-coloured base. Branches at an angle of about 45 degrees. Leaves rather thick and rigid, lower stalked, opposite, upper alternate, elliptic to linear, ¾–1¼ in. long, obtuse or rotundate, often with a few obscure teeth. Flowers solitary in the axils of the alternate leafy bracts, which are gradually smaller upwards. Pedicels shorter than the calyx. Bracteoles linear. Calyx hispid, campanulate, about ½ in. in diam., equally 5-lobed; lobes triangular, obtuse, equalling the tube, costate or almost keeled, elegantly veined. Corolla yellow with red lines; tube very short, contracted at the top and then expanded into a campanulate, almost equally 5-lobed limb; lobes rounded. Stamens nearly equalling the corolla; filaments bearded above the middle; anther-cells large, unequal, obtuse, the larger one embracing the smaller in a half spiral; connective of the longer stamens produced above the cells.—*Melasma pictum*, Hiern in Cat. Afr. Pl. Welw. i. 770.

Lower Guinea. Angola: Huilla; in swampy pastures between Lopollo and the Monino, parasitical on the roots of Leguminosæ and Convolvulaceæ, *Welwitsch*, 5799!

Description partly from Hiern.

12. **A. Vogelii,** *Benth. in DC. Prodr.* x. 339. An erect herb, 9–18 in. high, somewhat roughly hairy in nearly all parts, branching from the base; branches numerous, straight and crowded, floriferous almost from the base. Radical leaves not seen. Stem-leaves small, bract-like, usually about 1 in. long, occasionally as much as 2, bearing solitary flowers in their axils, lanceolate or linear, subacute, entire, triplinerved. Flowers bright orange (*Barter*), distinctly pedicellate, about ½ in. in diam. Floral-leaves or bracts mostly longer than the flowers. Bracteoles spathulate, unequal, the longer nearly equalling the calyx, hispid. Calyx 10-nerved, subcampanulate, almost equally 5-lobed; lobes triangular, rather obtuse, one or more sometimes notched,

1½–2 lin. long, equalling the tube. Corolla campanulate; lobes rounded. Filaments glabrous; anthers horseshoe-shaped, cells not apiculate.

Upper Guinea. Lagos, *Millen*, 172! Northern Nigeria: Borgu, *Barter*, 789! Mount Patteh, *Vogel*, 186!

Lower Guinea. Angola: Boma, *Monteiro!* Amboland: Olukonda, *Schinz*, 17!

Mozamb. Dist. Melambe River, Zambesi Delta, *Kirk!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 362! Ngamiland: Botletle Valley, *Lugard*, 210!

13. **A. asperrima,** *Benth. in DC. Prodr.* x. 340. An erect scabrid herb, 6 in. to a foot or more high, apparently a root-parasite. Stems simple or slightly branched. Leaves ovate or oblong, obtuse, ½–1½ in. long, sometimes irregularly toothed, very rough on both surfaces, the bristles having large white tubercular bases. Flowers solitary in the axils of leafy bracts, almost sessile; bracts lanceolate, longer than the flowers, entire or lower one sometimes toothed; bracteoles linear or lanceolate, as long as the calyx. Calyx campanulate, nearly equally 5-lobed, enlarging in fruit, nearly ½ in. long, very rough with tubercular bristles, and more or less distinctly 10-ribbed; lobes deltoid, about as long as the tube. Corolla not seen perfect. Filaments glabrous, dilated; anther-cells apiculate.—Engl. Hochgebirgsfl. Trop. Afr. 381. *Glossostylis asperrima*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 117.

Nile Land. Eritrea: Mount Alam Kale, north-west of Aidereso. *Schweinfurth*, 1631! Abyssinia: Haramat; foot of Mount Amba Zion (Tsion), near Geraz, *Schimper*, 1094! Somaliland, *Mrs. Lort Phillips!* Uganda: Nandi, 7000 to 8000 ft., *Scott-Elliot*, 7013!

14. **A. rigida,** *Hemsl.* An erect, hispid, apparently annual parasitic herb, 9–18 in. high. Stem rather slender, rigid, simple or bearing few erect branches, florescent only towards the tips. Leaves all opposite, sessile, thick, rigid, adpressed to the stem, beset, especially on the edge, with white tubercular bristles, linear-lanceolate or oblong, ½–1 in. long, obtuse, usually having 3 or 4 small, thickened, glandular teeth on each side. Flowers about ⅓ in. in diam., solitary and almost sessile in the axils of opposite, or sometimes alternate, ovate bracts, bidentate above the middle, about as long as the calyx; bracteoles 2, linear, equalling the calyx-tube. Calyx pubescent outside, campanulate, 3–4 lin. long, 10-ribbed, 5-lobed; lobes unequal, shorter than the tube, rather obtuse. Corolla glabrous, 5–6 lin. long, longitudinally veined; tube about 1½ lin. long, constricted at the top and then expanding into an oblique, 5-lobed limb. Stamens 4; filaments filiform, glabrous; anther-cells slightly divergent, apiculate.—*Melasma rigidum*, Hiern in Cat. Afr. Pl. Welw. i. 767.

Lower Guinea. Huilla: between Ivantala and Quilengues, *Welwitsch*, 5797!

Description partly from Hiern.

15. **A. virgata,** *Hemsl.* A hispid perennial. Stems erect, about 6 in. high, very slender, rigid, leafy throughout. Leaves all opposite,

sessile, rigid, thick, ovate-oblong or lanceolate, the largest about ½ in. long, equalling the internodes, rather obtuse, entire or furnished with a pair of small teeth near the middle, setulose, especially on the margin and midrib on the underside. Flowers solitary in the axils of the opposite leaves or bracts, very shortly pedicellate; floral-leaves or bracts shorter than the flowers, similar to the leaves; bracteoles linear-lanceolate, about 2 lin. long, setulose. Calyx hispid, about ⅓ in. long, 10-ribbed, nearly equally 5-lobed; lobes oblong, obtuse, shorter than the tube. Corolla about ½ in. long, narrow-campanulate, constricted close above the ovary; lobes very short, rounded, notched. Stamens nearly equal; filaments filiform, bearded close under the anthers; anther-cells almost equal, mucronulate.

Upper Guinea. Lagos: Yoruba, *Millson.*

Our specimens are evidently full length, as one at least has roots, but they may be from starved plants, and the normal dimensions may be larger.

16. **A. aurantiaca,** *Hemsl.* An annual, parasitic herb, rough with warted or tubercled bristles, interspersed with softer hairs, 2–4 in. high, branching from the base. "Primary stem subterranean, bright orange in colour"; branches slender, alternate. Leaves crowded, apparently all alternate, sessile, rather thick, narrow-lanceolate or spathulate, the longest about 1 in. long, obtuse tapering to the base, few-toothed. Flowers shortly pedicellate, yellow, solitary in the axils of the upper leaves or bracts, about ¾ in. long; bracts similar to the leaves, longer than the flowers, smaller upwards, adnate to the base of the pedicel; bracteoles linear, acute, about ¼ in. long, thinly clothed, as well as the calyx, with long soft hairs. Calyx thin, about ⅓ in. long, 10-nerved, nearly equally 5-lobed; lobes triangular, scarcely acute, about as long as the tube. Corolla obliquely campanulate, about ¾ in. long, veined, 5-lobed; lobes rounded. Stamens nearly equal; filaments all bearded, the longer very strongly; anther-cells slightly unequal, apiculate. Ovary glabrous; style longer than the stamens, club-shaped above the middle, strongly recurved.—*Bopusia scabra,* Hiern in Cat. Afr. Pl. Welw. i. 772, not of Presl.

Lower Guinea. Mossamedes: in sandy, moist, and bushy places by the River Bero, *Welwitsch,* 5809!

This has the characters of *Alectra,* including yellow flowers, a marcescent, persistent corolla, and a clavate, recurved style. *Bopusia scabra,* Presl (*Graderia scabra,* Benth.), also differs in being perennial and woody at the base and in having pink flowers and a deciduous corolla.

17. **A. trinervis,** *Hemsl.* An erect, hispid, not tuberculate, herb, 8–15 in. high. Stems slender, weak, simple or forked. Leaves opposite, except in the inflorescence, distinctly stalked, rather thick, ovate or oblong-lanceolate, or the lowermost smaller and nearly orbicular, largest scarcely 1½ in. long, obtuse or rounded, entire or with a few small teeth, 3-nerved, hispid on both surfaces. Flowers few, shortly pedicellate, about ½ in. long. Bracts or floral-leaves ovate-oblong, mostly as long as the flowers. Bracteoles shorter than the calyx, linear. Calyx softly

pubescent, thin, indistinctly 10-nerved, nearly equally 5-lobed; lobes broadly triangular, somewhat obtuse, about as long as the tube. Corolla veined longitudinally, nearly equally 5-lobed; lobes shorter than the tube, rounded. Stamens 4, nearly equal; filaments filiform, all bearded; anther-cells equal, apiculate.

Lower Guinea. Angola: Loanda, *Gossweiler*, 378!

18. **A. senegalensis,** *Benth. in DC. Prodr.* x. 339. An erect more or less hispid, apparently annual herb. Stems slender, simple or with a few erect branches, 6 in. to 2 ft. high. Leaves opposite, except in the inflorescence, very shortly stalked, rather thick, very variable in shape; lower smaller, orbicular or ovate; upper ovate or lanceolate, ¼–1 in. long, rounded, obtuse or acute, entire or with a few teeth, 3-nerved. Flowers not very numerous, about ½ in. long, very shortly pedicellate; bracts or floral leaves mostly longer than the flowers; bracteoles filiform, or broadest at the tip, almost as long as the calyx, ciliate. Calyx campanulate, distinctly 10-nerved, ciliate on the margin and along the nerves, nearly equally 5-lobed; lobes as long as the tube, acuminate, acute. Corolla about a third longer than the calyx. Stamens very unequal; filaments filiform, the longer ones bearded; anther-cells nearly equal, apiculate.—Hook. f. in Journ. Linn. Soc. vii. 209. *Melasma indicum*, Engl. Glied. Veg. Usambara, reprint 58 and 65; Hochgebirgsfl. Trop. Afr. 381; not *Alectra indica*, Benth.

Upper Guinea. Senegambia, *Leprieur*, 9, 10! *Heudelot*, 787! Gambia, *Brown-Lester*, 7! 27! Cameroons: Cameroon Mountain, 5000–7000 ft., *Mann*, 1262! 1985!

Mozamb. Dist. German East Africa: Usambara, *Holst*, 8945! British Central Africa: Nyasaland; Namasi, *Cameron*, 52!

19. **A. cordata,** *Benth. in DC. Prodr.* x. 339. An erect herb, 4–8 in. high, slightly roughly hairy. Stems very slender, simple or having one or two pairs of branches. Radical leaves not seen. Stem leaves all opposite, sessile or very shortly stalked, thin, cordate-ovate or cordate-elliptic, obtuse or rotundate; upper ones ovate-lanceolate or lanceolate, acute; all 3- or 4-toothed on each side, ½–1¼ in. long, 3-nerved. Flowers very shortly pedicellate. Floral-leaves or bracts longer than the flowers. Bracteoles linear, acuminate, nearly as long as the calyx, coarsely hairy. Calyx nearly equally 5-lobed, 10-ribbed, ribs and margins furnished with a few coarse hairs; lobes deltoid, about ⅓ in. long, acute, margins thickened. Corolla scarcely longer than the calyx. Filaments and anthers of the longer stamens bearded; anther-cells apiculate.—*Glossostylis cordata*, Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 116. *Melasma cordatum*, Engl. Pfl. Ost-Afr. C. 358.

Nile Land. Abyssinia: Tigre; near Gafta, *Schimper*, 1229!

The Indian specimens formerly referred to this species prove to be *A. indica*, Benth.

20. **A. melampyroides,** *Benth. in DC. Prodr.* x. 339. An erect, pilose, slightly hispid, apparently annual herb. Stems slender, very

straight, stiff, simple or with a few erect branches, 6–18 in. high. Leaves sessile, rather thick, almost erect and pressed against the stem, $\frac{1}{4}$–$\frac{3}{4}$ in. long; the lower broadly ovate, opposite, lowermost gradually smaller downwards, almost orbicular; the upper lanceolate, alternate; all, except the lowermost, coarsely toothed (teeth in the dried state hooked in the upper ones), acute, rounded or cuneate at the base, mostly longer than the internodes, 3–5-nerved; nerves prominent below. Bracts sometimes shorter than the flowers, with about three long hooked teeth on each side, ciliolate. Bracteoles subulate, hooked, nearly as long as the calyx. Flowers few, very shortly pedicellate, $\frac{1}{2}$–$\frac{3}{4}$ in. long. Calyx glabrous except the ciliolate margin, $\frac{1}{4}$–$\frac{1}{3}$ in. long, almost equally 5-lobed; lobes about as long as the tube, hooked, ciliolate. Corolla considerably longer than the calyx; lobes rounded. Stamens very unequal; filaments of the longer ones bearded; anther-cells apiculate.—*Melasma sessiliflorum*, Hiern in Cat. Afr. Pl. Welw. i. 767, and in Dyer, Fl. Cap. iv. ii. 375. *M. indicum*, Engl. & Gilg in Baum, Kunene-Samb. Exp. 364, but not *Alectra indica*, Benth.

Lower Guinea. Angola: Huilla; at the base of Morro de Lopollo, *Welwitsch*, 5802! Kampuluve stream, *Baum*, 738! Kubango River, between Kavanga and Kalolo, *Baum*, 424!

Mozamb. Dist. British Central Africa: Nyasaland; top of Mount Zomba, *Buchanan*, 293!

Also widely spread in South Africa. Welwitsch's 5801 may also belong to this species, but it has spreading leaves, and the specimen is too young for satisfactory determination, but as the corolla is described as galeate-bilabiate it may belong to a different genus, perhaps to *Bartsia*. *Melasma indicum*, var. *monticolum*, Engl. (*Jahrb.* xxx. 402) is probably a variety of *Alectra melampyroides*.

21. **A. communis,** *Hemsl.* An erect, pubescent, slightly hispid herb. Stem rather stout, 1–2 ft. high, with numerous short, slender branches from about the middle. Leaves narrowed into a short petiole, opposite, except in the inflorescence, spreading, rather thick, lanceolate, oblong-lanceolate or ovate-lanceolate, usually 1–1½ (occasionally 2) in. long, scarcely acute, coarsely and distantly toothed, teeth thickened at the tips, 3-nerved nearly to the tip. Flowers usually very numerous, crowded, shortly pedicellate. Bracts leaf-like, usually much longer than the flowers. Bracteoles almost filiform, setulose, somewhat shorter than the calyx or equalling it. Calyx setulose, outer ribs and margin broadly campanulate, 10-ribbed, net-veined; lobes triangular, acuminate, longer than the tube. Corolla little longer than the calyx. Stamens unequal; filaments of the longer ones bearded; anther-cells slightly unequal, apiculate.

Upper Guinea. Liberia: Kaka town, *Whyte!*

Nile Land. Uganda: Mawokota, *Brown*, 191! Kavirondo, *Whyte!*

Mozamb. Distr. British Central Africa: Nyasaland; Masuku and Tanganyika Plateau, *Whyte!* Mount Chiradzulu, *Whyte!* Shire Highlands, *Buchanan*, 151! Manganja hills, *Kirk!* and without exact locality, *Buchanan!*

Under favourable conditions this is a robust plant probably three or four feet high. Buchanan describes it as a "large bush." In herbaria it has been confused with *A. melampyroides*, Benth.

39. **GERARDIINA**, Engl. in Engl. Jahrb. xxiii. 507, t. 10, G—M.

Calyx campanulate, almost equally 5-toothed; teeth shorter than the tube, valvate. Corolla obliquely campanulate, slightly 2-lipped; lobes rounded, spreading or recurved; lowermost largest, the two upper inside in bud. Stamens 4, included and attached near the base of the corolla-tube, the anterior pair nearly twice as long as the posterior; filaments of the longer ones bearded above the middle; anther-cells nearly equal, divergent. Style glabrous, thickened and recurved near the apex, slightly exserted. Ovules very numerous. Capsule ovoid, equalling the calyx, 2-celled, many-seeded. Seeds linear or linear-cuneiform.—An erect herb. Leaves opposite, undivided. Flowers showy in terminal racemes.

A monotypic genus, also occurs in South Africa.

1. **G. angolensis,** *Engl. in Engl. Jahrb.* xxiii. 507, *t.* 10, *G—M.* A perennial, hispid, erect herb. Stems rigid, straight, unbranched, 2–3 ft. high, terete or flattened in the upper part; internodes much shorter than the leaves. Leaves opposite, sessile, thick, rigid, hispid, especially on the upper surface and along the nerves, linear-lanceolate, 2–4 in. long; lower ones rounded or obtuse; upper acute, erect or adpressed to the stem, strongly 3-nerved. Racemes 4–6 in. long; pedicels very slender, slightly exceeding the bracts. Flowers purple-violet or violet-blue (*Welwitsch*), about 1 in. long and broad, solitary in the axils of opposite, cordate, stem-clasping, usually 2–3 lin. long bracts. Calyx thickly minutely glandular-pitted, about ¼ in. in diam.; lobes deltoid or rounded. Corolla-tube hairy on the inside at the base of the upper lip; lobes nearly semicircular, two upper smallest and about half as large as the lowermost.—Hiern in Cat. Afr. Pl. Welw. i. 770; and in Dyer, Fl. Cap. iv. ii, 378; Engl. & Gilg in Baum, Kunene-Samb. Exped. 365.

Lower Guinea. Angola: Huilla; by the Lopollo and Humpata streams, *Welwitsch*, 5846! by the River Longa, below Napalanka, 3800 ft., *Baum*, 582; Malange, *Gossweiler*, 1279!

Mozamb. Dist. German East Africa: between Lake Tanganyika and Lake Rukwa, 6000 ft., *Nutt!* British Central Africa: Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt!*

This has also been collected in the Transvaal, *Rehmann*, 5995.

40. **BUCHNERA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 968.

Calyx tubular, 10- (rarely 7- or 8-) nerved or ribbed, the nerves sometimes very faint or quite obscured, 5- (more rarely 4-) toothed. Corolla-tube slender, straight or slightly incurved; limb spreading, subequally 5-fid; lobes usually flat, the 2 upper inside. Stamens 4, didynamous, included; anthers 1-celled, vertical, dorsifixed; connective usually mucronate at the apex. Style thickened or clavate above, stigmatose at the entire or emarginate apex. Ovules numerous in each cell. Capsule oblong, ovoid or ovoid-oblong, loculicidal; valves coriaceous,

entire, separating from the placentas. Seeds very many, obovoid or oblong; testa reticulate.—Herbs often parasitic and drying black, usually scabrid and rigid. Leaves opposite or sometimes rosulate below, usually alternate above, simple, entire or toothed, the lower rather broad; the upper narrower and passing into bracts. Flowers solitary in the axils of bracts, usually sessile, nearly always 2-bracteolate, crowded or distant in terminal spikes, very rarely solitary in the axils of the leaves, blue or violet, white, rose or rarely scarlet.—*Stellularia*, Benth. in Hook. Ic. Pl. t. 1318. *Benthamistella*, O. Kuntze, Rev. Gen. Pl. ii. 458.

Species about 78, in the warmer parts of both hemispheres.

* Flowers in dense subglobose ovoid quadrangular or cylindric usually short spikes or heads, which do not elongate, or only slightly, in fruit; stems erect.

† Spikes simple.

‡ Bracts all close together.

Spikes, especially in fruit, distinctly quadrangular.

Leaves lanceolate or oblong, usually 1 in. long or more.

Bracteoles present; corolla-limb 3–3½ lin. in diam.

Bracts all entire . . . . . 1. *B. lippioides.*

Bracts, at least the upper, 3-toothed or -lobed . . . . . 2. *B. trilobata.*

Bracteoles absent; corolla-limb 1⅓ lin. in diam. . . . . 3. *B. ruwenzoriensis.*

Leaves linear or subulate, 2–3½ lin. long . 4. *B. quadrifaria.*

Spikes not distinctly quadrangular.

§ Spikes short, as broad or nearly as broad as long.

Plants rather small and slender, usually with narrow leaves and small spikes.

Corolla-limb 4 or 5 lin. in diam.

Spikes glabrous except the ciliolate bracts . . . . . 5. *B. ciliolata.*

Spikes distinctly hairy . . 6. *B. humilis.*

Corolla-limb only 2 or 3 lin. in diam.

Calyx 1½ lin. long; teeth obscure; corolla-tube 1½–1¾ lin. long . . . . . 7. *B. angolensis.*

Calyx 3 lin. long; teeth distinct, ½ lin. long; corolla-tube 3 lin. long . . . . 8. *B. minutiflora.*

Plants usually more than 1 ft. high with rather broad leaves and large spikes.

Spikes covered with long white silky hairs . . . . 9. *B. splendens.*

Spikes without long white silky hairs, usually hispidly hairy.
Spikes up to 7 lin. broad; bracts $1\frac{3}{4}$–3 lin. long; corolla-tube $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long.
Calyx 5-toothed; corolla-tube $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, more or less pilose.
Leaves entire or rarely toothed; spikes short, rarely up to $1\frac{1}{3}$ in. long — 10. *B. capitata.*
Leaves often distinctly toothed; spikes up to $2\frac{1}{4}$ in. long . . . — 11. *B. paucidentata.*
Calyx 4-toothed; corolla-tube about $3\frac{1}{2}$ lin. long, glabrous — 12. *B. affinis.*
Spikes 7 lin. broad; bracts 3–5 lin. long; corolla-tube $4\frac{1}{2}$–5 lin. long . . . . — 13. *B. quangensis.*
Spikes 9 lin. broad or more; bracts $3\frac{1}{2}$–$4\frac{1}{2}$ lin. long.
Calyx $2\frac{1}{2}$ lin. long; teeth scarcely more than $\frac{1}{2}$ lin. long . . . — 14. *B. subcapitata.*
Calyx $3\frac{3}{4}$–$4\frac{3}{4}$ lin. long; teeth 1–2 lin. long . . . — 15. *B. pulchra.*

§§ Spikes rather long and slender, usually much longer than broad.
Stem leaves 2–$7\frac{1}{2}$ lin. long.
Stem leaves very few (only 1–3 pairs and in *B. attenuata* 2 or 3 odd ones); calyx $2\frac{1}{3}$–3 lin. long.
Bracts ovate, $1\frac{1}{4}$ lin. long; corolla-tube 3 lin. long . . . — 16. *B. attenuata.*
Bracts lanceolate, 5 lin. long; tube 5–6 lin. long . . — 17. *B. rungwensis.*
Stem leaves in several pairs; calyx only 1–$1\frac{1}{2}$ lin. long . . . — 18. *B. strictissima.*
Stem leaves usually 1 in. long or more.
Bracts 1–$2\frac{1}{2}$ lin. long, as broad or nearly as broad as long.
Spikes almost glabrous: bracts 2–$2\frac{1}{2}$ lin. long . . . — 19. *B. ensifolia.*
Spikes rather densely hairy; bracts about 1 lin. long . — 20. *B. latibracteata.*
Bracts usually more than $2\frac{1}{2}$ lin. long, much longer than broad.
Calyx-teeth 4 . . . . — 21. *B. crassifolia.*
Calyx-teeth 5.
Plant nearly glabrous . . — 22. *B. namuliensis.*
Plant distinctly hairy.
Stems leafy . . . — 23. *B. Welwitschii.*
Stems very sparingly leafy.

Spikes densely and softly hairy . . 24. *B. reissiana.*
Spikes more sparingly and rather hispidly hairy.
Corolla-limb only $1\frac{1}{2}$ lin. in diam. 25. *B. Randii.*
Corolla-limb about 4 lin. in diam. . 26. *B. Poggei.*

‡‡ Bracts close together in the upper part of the spike, a few at the base more or less distant.
Plant $1\frac{1}{4}$ ft. high . . . . . 27. *B. albiflora.*
Plant only $1\frac{1}{2}$–$2\frac{3}{4}$ in. high . . . 28. *B. Verdickii.*

†† Spikes or heads compound, at least at the base.
Flowers in very dense heads; plants $\frac{2}{3}$–$1\frac{1}{2}$ ft. high or more, hispidly hairy.
Stem sparingly leafy; flower-heads axillary . 29. *B. Nuttii.*
Stem very leafy; flower-heads terminal.
Calyx 5-toothed, shortly hairy on the ribs . 30. *B. andongensis.*
Calyx 4-toothed, long-hairy on the ribs . 31. *B. foliosa.*
Flowers in a rather loose head; plant about 6 in. high, almost quite glabrous . . 32. *B. nitida.*

** Flowers in long often lax and slender spikes, which usually elongate very much in fruit; stems erect.
Calyx-teeth 4.
Corolla-tube slightly inflated above the calyx . 35. *B. inflata.*
Corolla-tube cylindric (not inflated above the calyx).
Leaves linear-lanceolate; spikes $1\frac{1}{2}$–2 in. long 33. *B. nigricans.*
Leaves narrowly linear; spikes 5 in. long . 34. *B. benthamiana.*
Calyx-teeth 5.
Spikes continuous even in fruit or only slightly interrupted at the base.
Corolla-tube much longer than the calyx; lobes $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, thick . . . 36. *B. tuberosa.*
Corolla-tube as long as or only slightly longer than the calyx; lobes $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, thin.
Bracts 8 lin. long, about 2 lin. longer than the calyx . . . . . 37. *B. usuiensis.*
Bracts 4–$5\frac{1}{4}$ lin. long, shorter to $\frac{1}{4}$ lin. longer than the calyx . . . 38. *B. similis.*

Spikes, especially in fruit, very much interrupted.
† Spikes glabrous or nearly so.
Stem leaves very narrowly linear.
Spike few-flowered; corolla scarlet or orange-red; lobes $3\frac{1}{2}$–5 lin. long 40. B. *fulgens.*
Spike many-flowered; corolla bluish; lobes $1\frac{3}{4}$–$2\frac{1}{2}$ lin. long . . 41. *B. Baumii.*
Stem leaves usually lanceolate, sometimes linear-lanceolate or oblong.
Corolla-tube $1\frac{1}{3}$–$4\frac{1}{2}$ lin. long; lobes $\frac{1}{2}$–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–1 lin. broad.
Plant 9–12 in. high; bracteoles absent; calyx $1\frac{1}{4}$–2 lin. long . 42. *B. humpatensis.*

Plant 1–2½ ft. high; bracteoles present; calyx 2¼–4¼ lin. long. All the leaves lanceolate; bracts 3–5 lin. long, distinctly opposite . . . . 39. *B. Lastii.*
Lower leaves oblong; bracts 1⅓–2¼ lin. long, subopposite or alternate . . . . 43. *B. leptostachya.*
Corolla-tube 8 lin. long; lobes 5 lin. long and broad . . . . 44. *B. speciosa.*

†† Spikes distinctly hairy.

‡ Corolla-limb 5–7 lin. in diam.

Leaves linear or linear-lanceolate, usually 1 in. long or more.
Corolla-tube curved, gradually widened towards the apex . 45. *B. longespicata.*
Corolla-tube straight, cylindric.
Plant not or very sparingly branched, 1½–1¾ ft. high . 46. *B. pallescens.*
Plant much branched, dwarf or rarely more than 1 ft. high . 47. *B. Henriquesii.*
Leaves oblong-spathulate, 3½–5 lin. long . . . . . 48. *B. multicaulis.*

‡‡ Corolla-limb 3–4 lin. in diam.

Plant rather slender, up to 1¾ ft. high, sparingly branched; spikes usually under 6 in. long: flowers not very numerous . . . 49. *B. hispida.*
Plant robust up to 2½ ft. high, much branched; spikes up to 1 ft. long or more; flowers very numerous . 50. *B. longifolia.*

*** Flowers axillary, solitary; stems prostrate . . 51. *B. prorepens.*

1. **B. lippioides,** *Vatke in Engl. Jahrb.* xviii. 68, *in key, t.* 3, *figs. O, P.* An erect pubescent hispid annual herb, 1½–3 ft. high; stem simple or branched at the apex, 1¾–2½ lin. thick at the base, leafy; internodes ¾–2¼ in. long. Leaves opposite, narrowly oblong, the lower 2 in. long, 4½–7½ lin. broad, decreasing in size on the upper part of the stem, obtuse, 3-nerved, somewhat narrowed at the base. Flowers in terminal and axillary quadrangular spikes, ¾–1½ in. long; bracts ovate to ovate-orbicular, 3½–4 lin. long, 3 lin. broad, acute, pilose on the under side, concave, ciliate; bracteoles similar but much narrower. Calyx cylindric, 4–4¼ lin. long, pilose on the nerves; teeth semi-ovate, ½–¾ lin. long, rather thickened, mucronate. Corolla dark blue; tube 5–5½ lin. long, very slightly curved, somewhat wider at the top, very sparingly and minutely glandular-pubescent outside, shortly pilose inside; lobes suborbicular-obovate, 2¼–3 lin. in diam.—Engl. & Gilg in Baum, Kunene-Samb. Exped. 368. *B. trinervia,* Engl. in Engl. Jahrb. xxiii. 512; Hiern in Cat. Afr. Pl. Welw. i. 777.

Lower Guinea. Angola: Pungo Andongo, *Welwitsch,* 5883! between Luxillo and Cazella, *Welwitsch,* 5885! Near Manonge on the Kuebe River 4400 ft., *Baum,* 849!

2. **B. trilobata,** *Skan.* Stems erect, 1 ft. high or more, terete or slightly bisulcate, simple below, sparingly branched near the apex, pubescent with small or minute spreading or deflexed hairs; branches rather short, nearly erect. Leaves opposite or subopposite, lanceolate, 6–10 lin. long, 1–2½ lin. broad, narrowed sometimes very slightly at the apex and base, apiculate, entire, pubescent on both sides (more sparingly on the underside). Spikes terminal or lateral, at first subglobose, afterwards narrow and somewhat quadrangular, densely-flowered, up to 1 in. long; lower bracts ovate-lanceolate, 2½ lin. long, 1 lin. broad, acuminate, rather densely pilose; upper bracts 2 lin. long, 1 lin. broad, obovate-cuneate below, 3-lobed at the apex, the lateral lobes rounded and denticulate and the central lobe narrowly triangular and acuminate, long-ciliate, partly scarious; bracteoles lanceolate, 1½ lin. long, acuminate, long-ciliate. Calyx 2–2¾ lin. long, 4-toothed, 4-nerved, scarious between the nerves; teeth subulate-lanceolate, 1–1½ lin. long, long-ciliate. Corolla white, funnel-shaped, pilose outside; tube 2¾–3½ lin. long, ⅔ lin. broad, distinctly curved about the middle; limb about 3½ lin. in diam.; lobes orbicular to ovate, 1–1½ lin. long, 1 lin. broad. Anthers scarcely acute, only ⅓ lin. long. Style ¾ lin. long. Capsule oblong-ovoid, 1½–1¾ lin. long.

Mozamb. Dist. British Central Africa: Nyasaland; Nyika Plateau, 7000 ft., *McClounie,* 55! and without precise locality, *Whyte!*

3. **B. ruwenzoriensis,** *Skan.* An erect annual herb about 1 ft. high; stem simple or sparingly branched near the apex, obscurely quadrangular, rather densely pubescent, 1¼ lin. thick near the base; internodes short at the base, 1¼–4 in. long above. Basal leaves oblong, about 1 in. long, 4–6 lin. broad, obtuse, few-toothed, pilose below chiefly on the nerves, scabrid above with small white points; upper leaves opposite or subopposite, lanceolate, 1–1¾ in. long, 2–2½ lin. broad, obtuse or acute, 3-nerved, pubescent and scabrid like the basal leaves, entire. Spikes terminal or lateral, quadrangular, ¾–1¼ in. long, densely flowered; bracts ovate-lanceolate, 2¼ lin. long, ¾–1 lin. broad, acuminate, sometimes bifid at the apex, concave, sometimes flattened on the back, rather densely pilose; bracteoles 0. Calyx 2¼–2½ lin. long, densely pilose, 10-nerved, 5-toothed; teeth narrowly triangular, acuminate, unequal, ½–¾ lin. long. Corolla blue, pubescent outside on the upper part of the tube and on the lobes; tube 2–2¼ lin. long, scarcely ⅓ lin. broad, curved, cylindric; limb 1⅓ lin. in diam.; lobes obovate-cuneate, about ½ lin. long, minutely crenulate at the apex. Anthers acuminate. Style nearly 1 lin. long. Capsule oblong-ovoid, 2½ lin. long, apiculate.

Nile Land. Uganda: Ruwenzori, hillsides below 7000 ft., *Scott-Elliot,* 7782! Entebbe, *Bagshawe,* 743!

4. **B. quadrifaria,** *Baker in Kew Bulletin,* 1895, 71. A slender erect annual, 1–2 ft. high; stem quadrangular, simple or sparingly branched, ½ lin. thick, sparingly and minutely pubescent, somewhat scabrid; branches nearly erect; internodes up to 3 in. long. Leaves few, minute, opposite or alternate, linear or subulate, 2–3½ lin. long,

rigid, minutely and sparingly pubescent. Flowers in terminal crowded quadrifarious spikes $\frac{1}{3}$–1 in. long; bracts broadly ovate- or elliptic-rhomboid, $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad (sometimes almost 3-lobed at the apex, the lateral lobes rounded, the middle lobe cuneate), acuminate, rigid, partly scarious, glabrous except for a few minute stiff hairs on the margin at the apex; bracteoles linear-lanceolate, $1\frac{3}{4}$ lin. long, keeled. Calyx $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, deeply 4-toothed, 4-nerved, scarious between the nerves, more deeply slit down on the lower side, glabrous except for a few minute hairs on the teeth; teeth 1–$1\frac{1}{4}$ lin. long, subulate-lanceolate. Corolla-tube $2\frac{3}{4}$–4 lin. long, very narrow, straight or slightly curved, cylindric, glabrous outside, pilose inside; upper lobes elliptic to obovate, 1–$1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad; lower lobes 2–3 lin. long, 1–$1\frac{1}{2}$ lin. broad, oblong. Anthers acuminate. Style $\frac{2}{3}$–$\frac{3}{4}$ lin. long. Capsule oblong, $1\frac{1}{2}$ lin. long, apiculate.

Mozamb. Dist. German East Africa: between Lakes Tanganyika and Rukwa, 6000 ft., *Nutt!* Lower plateau, north of Lake Nyasa, *Thomson!* British Central Africa: Urungu; Fwambo, *Carson*, 100! Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Nyika Plateau, 6000–7000 ft., *Whyte*, 146!

5. **B. ciliolata,** *Engl. in Engl. Jahrb.* xviii. 69, *t.* 3, *figs. C, D.* A very small and slender erect annual herb about 5 in. high, branched chiefly from the base; stem and branches almost filiform, terete, glabrous, sparingly leafy. Leaves opposite or subopposite, linear, 4–9 lin. long, about $\frac{1}{2}$ lin. broad, acute, glabrous or with a few scabrid white points. Flowers in terminal crowded ovoid spikes 3–6 lin. long; bracts ovate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, acute or acuminate, sometimes minutely toothed and somewhat scarious at the apex, glabrous, concave; bracteoles narrowly linear, $\frac{2}{3}$ lin. long, glabrous. Calyx $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, bipartite, 4-toothed, 4-nerved, scarious between the nerves; teeth ovate-lanceolate, $\frac{3}{4}$ lin. long, acuminate. Corolla-tube $2\frac{1}{2}$ lin. long, straight, cylindric, glabrous outside, covered with short reddish hairs inside; lobes oblong, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, often emarginate or bifid at the apex, somewhat pulverulent inside, the lower longer than the upper. Anthers acute. Style scarcely $\frac{1}{2}$ lin. long. Capsule oblong, $1\frac{1}{2}$ lin. long, minutely apiculate, bisulcate.—Hiern in Cat. Afr. Pl. Welw. i. 775; Engl. & Gilg in Baum, Kunene-Samb. Exped. 366.

Lower Guinea. Angola: Huilla; by the River Palanca, *Newton!* on the Humpata Plateau, *Welwitsch*, 5828! by the River Kubango, above Kohi, 4400 ft., *Baum*, 914!

6. **B. humilis,** *Skan.* A small slender erect annual herb about 9 in. high; stem simple or simple below and sparingly branched above, terete, sparsely pilose, few-leaved; branches nearly erect, 3–$5\frac{1}{2}$ in. long; internodes $1\frac{1}{4}$–$2\frac{1}{4}$ in. long. Lower leaves opposite, oblong to lanceolate, 8–14 lin. long, $2\frac{1}{2}$–4 lin. broad, obtuse or apiculate, narrowed at the base into a very short petiole, sparingly pubescent, very scabrid, sometimes having 1 tooth on each side above the middle; upper leaves opposite or alternate, linear-lanceolate or linear, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, $\frac{1}{2}$–2 lin. broad, acute, sparingly pubescent, scabrid, entire. Spikes terminal (or sometimes on short lateral branches as well), 7–8 lin. long, densely-

flowered; bracts ovate-lanceolate or triangular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, long white-pilose on the back and margins; bracteoles filiform, about $\frac{3}{4}$ lin. long, pilose. Calyx $2\frac{1}{2}$ lin. long, rather densely pubescent, 10-nerved (5 thick nerves alternating with 5 thin ones), 5-toothed; teeth narrowly triangular, acuminate, $\frac{1}{2}$–$\frac{2}{3}$ lin. long. Corolla violet-blue; tube 4 lin. long, narrow, straight or slightly curved, white-pilose outside; lobes obovate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, 1–$1\frac{1}{3}$ lin. broad. Anthers acute. Capsule oblong, 2 lin. long.

Lower Guinea. Angola: Huilla; by the River Palanca, *Newton!*

7. **B. angolensis,** *Engl. in Engl. Jahrb.* xviii. 70, *t.* 3, *figs. G, H.* A slender erect freely branched annual 4–12 in. high, sparingly and minutely pubescent; stem and branches somewhat obscurely tetragonal; branches ascending, growing out at an acute angle with the stem. Leaves opposite or subopposite, narrowly linear, acuminate, $\frac{1}{2}$–$1\frac{1}{4}$ lin. long, $\frac{1}{2}$–1 lin. broad, sprinkled over with small rather hispid hairs. Flowers in dense terminal somewhat quadrifarious spikes 3–6 lin. long; lowermost bracts very broadly ovate, $1\frac{1}{2}$ lin. long, 2 lin. broad, with a terminal subulate tail-like appendage $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, pilose, ciliate; upper bracts rhomboid-orbicular, $1\frac{3}{4}$ lin. long, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. broad, acute or shortly acuminate, scarious, ciliate, concave; bracteoles narrowly obovoid-spathulate, about 1 lin. long, obtuse, otherwise as the upper bracts. Calyx about $1\frac{1}{2}$ lin. long, ovoid, scarious, very irregularly and obscurely 4- or 5-toothed, fimbriate-ciliate. Corolla violet-blue, very small; tube $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, sparingly pilose outside, pilose inside; limb only about $\frac{3}{4}$ lin. across; lobes oblong, about $\frac{1}{3}$ lin. long. Anthers scarcely acute. Style $\frac{1}{2}$ lin. long. Capsule ovoid, $1\frac{1}{4}$ lin. long, apiculate. —Hiern in Cat. Afr. Pl. Welw. i. 776.

Lower Guinea. Angola: Huilla; Humpata Plateau, near Empalanca, *Welwitsch,* 5829!

8. **B. minutiflora,** *Engl. in Engl. Jahrb.* xxx. 404. An annual herb 4–6 in. high, blackish when dry, minutely and sparsely pilose; stem slender, sparingly leafy, simple or branched above, more rarely branched at the base and middle; internodes $7\frac{1}{2}$–10 lin. long. Basal leaves oblong, about 4 lin. long and 2 lin. broad; cauline leaves linear, 10 lin. long, $\frac{1}{2}$ lin. broad, acute, spreading. Spikes terminal on the stems and branches, 3–$7\frac{1}{2}$ lin. long and broad, few- or many-flowered; bracts spreading, lanceolate from a concave base, about 4 lin. long; bracteoles narrowly linear, $1\frac{1}{2}$–2 lin. long. Calyx $2\frac{1}{4}$–3 lin. long, somewhat scarious, shortly and sparsely pilose, 5-toothed; teeth linear-triangular, acute, $\frac{1}{2}$ lin. long. Corolla small, violet; tube 3 lin. long, cylindric, narrow; lobes oblong-obovate, up to 1 lin. long and $\frac{1}{2}$ lin. broad, slightly unequal. Style about $\frac{3}{4}$ lin. long. Capsule narrowly oblong, $2\frac{1}{4}$ lin. long, nearly 1 lin. broad at the base, slightly narrower and rounded at the apex, minutely apiculate.

Mozamb. Dist. German East Africa: Kinga Mountains; Ukwama Mountain, 8200 ft., *Goetze,* 912!

9. **B. splendens,** *Engl. in Engl. Jahrb.* xviii. 71, *t.* 3, *fig. I.* An

annual, with a simple erect stem 2–3 ft. high, everywhere white-pilose, many-leaved. Basal leaves 2, broadly elliptic, 1¼–1½ in. long, ¾–1 in. broad, 5–6-nerved, obtuse, sparingly and hispidly pubescent; cauline leaves linear-oblong or lanceolate, 1¼–2 in. long, obtuse, hispidly pubescent, the lower opposite and 3-nerved, the upper alternate, smaller, and less distinctly nerved. Spike (young) ¾ in. long, densely covered with long silky hairs; bracts lanceolate, the lower 6–7½ lin. long, the upper shorter. Calyx cylindric, silky-pilose; tube 2½ lin. long; teeth 1 lin. long, lanceolate-subulate. Corolla deep violet; tube slender, 5 lin. long, very slightly curved, pilose on the upper part outside and at the throat inside; lobes obovate, the lower 3½ lin. long, 2½ lin. broad, somewhat larger than the upper.

Lower Guinea. Angola: Malange, in a marshy forest, *Buchner*, 9! *Gossweiler*, 1088!

10. **B. capitata,** *Benth. in DC. Prodr.* x. 495. An erect annual herb 1–2½ ft. high; stem simple or sparingly branched, slightly furrowed, ¾–2¼ lin. thick at the base, glabrous or minutely pubescent; internodes ¾–3 in. long. Leaves opposite or the upper alternate, sessile, oblong-lanceolate to linear, ¾–3 in. long, 2–8 lin. broad, acute or obtuse, scabrid, entire or obscurely few-toothed. Flowers in terminal crowded ovoid, ellipsoid or cylindric spikes 4–16 lin. long; bracts narrowly obovate, oblong-lanceolate or lanceolate, acuminate (sometimes abruptly), 1¾–3 lin. long, concave, rather densely pilose; bracteoles linear or filiform, 1¼–3 lin. long. Calyx 1½–2 lin. long, more or less pilose, 10-nerved (sometimes obscurely), 5-toothed; teeth subulate, ⅔–1½ lin. long. Corolla white; tube 1½–2½ lin. long, ⅓–½ lin. broad, curved, more or less pilose outside and inside; limb about 1–1½ lin. across; lobes obovate, about ½ lin. long and broad. Anthers acute or subacute. Style ¾ lin. long. Capsule subovoid, 1¼–1½ lin. long, obtuse.—Engl. Pfl. Ost-Afr. C. 359; Engl. in Schlechter, Westafr. Kautschuk-Exped. 314; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 45.

Nile Land. Niamniam: Merdyans Seriba, *Schweinfurth*, 3852! Uganda: Kalungu Marshes, *Scott-Elliot*, 7424!

Lower Guinea. Gaboon: Munda; Sibange Farm, *Soyaux*, 439! Lower Congo: Stanley Pool, 950 ft., *Hens*, B, 351! near Dolo, *Schlechter*, 12457! Bingila, *Dupuis*.

Mozamb. Dist. German East Africa: Karagwe; Bukoba, 3700 ft., *Stuhlmann*, 1562! 3742!

Also in Madagascar.

11. **B. paucidentata,** *Engl. MSS.* An erect branched herb 1–2 ft. high; stems 2 or 3, ½–1 lin. in diam., covered with very slender spreading hairs; internodes 1¼–2 in. long. Basal leaves broadly oblong, up to 1¾ in. long and 1 in. broad, few-toothed, obtuse, hairy on both sides, scabrid on the upper side; hairs on the upper side very short and thickened at the base; cauline leaves lanceolate to linear-lanceolate, apiculate or acuminate, 1¾–3 in. long, 2–6 lin. broad, 3-nerved, few-toothed above the middle or the upper quite entire, hairy like the basal

leaves, but less scabrid. Spikes densely-flowered, terminal on the stems and elongated branches, and on very short branches which arise in the axils of nearly all the cauline leaves, at first subglobose, 3–4 lin. in diam., growing out in the fruiting stage to 1¼ in. long, with some of the lower fruits separated from the rest; bracts lanceolate or subulate, 1½–3 lin. long, hispid; bracteoles minute or often wanting. Calyx 2 lin. long, 10-nerved, 5-toothed, hispid; teeth linear-triangular or subulate, ¾ lin. long. Corolla-tube 2 lin. long, slightly curved and somewhat contracted towards the apex, white-pilose above; lobes obovate, about ⅓ lin. long and ½ lin. broad. Anthers narrowly oblong, nearly ½ lin. long, acuminate. Style ¾ lin. long, clavate. Capsule ovoid, 1¾ lin. long, 1¼ lin. broad.

Upper Guinea. Cameroons, 4400 ft., *Conrau*, 12!

12. **B. affinis,** *De Wild. Études Fl. Katanga*, 123. Plant more than 1 ft. high, branched; branches ½–3½ in. long, glabrescent on the internodes, hairy on the nodes, with stiff white hairs thickened at the base. Lower leaves elliptic-oblong, about 3¼ in. long and 1 in. broad, entire or irregularly toothed, sessile, 3-nerved, scabrid on both sides; upper leaves narrower, always clearly 3-nerved, obtuse, cuneate at the base, more or less amplexicaul. Inflorescence spicate, terminal or lateral, long- or very shortly pedunculate, 6–11 lin. long, about 7 lin. thick; lowermost bracts like the leaves but reduced, as long as or a little longer than the spike; upper bracts oval, acute, about 2½ lin. long and 1¼ lin. broad, scabrid, with 3 keeled nerves; bracteoles linear, 2½ lin. long. Calyx 3 lin. long in flower increasing to 3½ lin. long in fruit, 4-toothed; teeth linear, ½–¾ lin. long and ¼ lin. broad in flower up to 2 lin. long in fruit. Corolla-tube glabrous, about 3½ lin. long; lobes obovate, 1½ lin. long, ¾–1 lin. broad. Fruit ovoid, 2½–3 lin. long, ¾–1 lin. thick, beaked.

South Central. Congo Free State: Katanga; plateau near Lukafu, *Verdick*, 42.

13. **B. quangensis,** *Engl. in Engl. Jahrb.* xviii. 71, *t.* 3, *fig. L.* Stem about 1⅓ ft. high, thick, branched, densely adpressed pilose, leafy; branches 8–10 in. long; internodes 1–1¼ in. long. Leaves lanceolate or oblanceolate, about 1¼ in. long, up to 2½ lin. broad, rather thick, entire, obtuse or sometimes acute, shortly and densely hispidly hairy on both sides. Spikes shortly cylindric, 10 lin. long, 7 lin. broad, very densely flowered; bracts ovate-lanceolate, 3–5 lin. long, acute, adpressed-pilose on the outside; bracteoles linear-lanceolate, about as long as the bracts. Calyx obconical-tubular, 4 lin. long, ½ lin. broad at the base, nearly 1½ lin. broad at the apex, rather densely pilose, 5-toothed; teeth narrowly ovate to triangular, ¾–1 lin. long, acute, the uppermost smallest. Corolla-tube 4½–5 lin. long, densely pilose above; lobes obovate, 1¼ lin. long and broad, the lower somewhat larger than the upper. Style 1¾ lin. long, thickened above.

Lower Guinea. Angola: Chamasango, on the River Kuango; *Teusz*, 540!

14. **B. subcapitata,** *Engl. in Engl. Jahrb.* xviii. 71, *t.* 3, *fig. Q.* Stem simple, many-leaved, densely hispid; internodes 1¼–1¾ in. long. Leaves lanceolate, 10–15 lin. long, 1½ lin. broad, acute, the upper alternate, densely clothed with short hairs thickened at the base. Spikes short, capitulum-like (superficially resembling those of a *Scabiosa*); bracts linear-lanceolate, about 3½ lin. long and 1 lin. broad, clothed on the margin and midrib with hairs thickened at the base. Calyx only 2½ lin. long, sparingly pilose; teeth triangular, about ¼ as long as the tube. Corolla-tube 5 lin. long, ½ lin. broad, glabrous; lobes obovate, 1½ lin. long. 1¼ lin. broad, the lower somewhat larger than the others.—De Wild. Études Fl. Katanga, 122.

South Central. Congo Free State: Lunda; Mussumba, *Pogge*, 275; Katanga; Lukafu, *Verdick*, 371.

15. **B. pulchra,** *Skan ex S. Moore in Journ. Linn. Soc.* xxxvii. 190. An erect pubescent scabrid herb 1–2 ft. high, drying green or brown; stem usually branched chiefly in the upper part, rather thick, moderately leafy; leaves opposite or the upper alternate, oblong-lanceolate, ¾–1¼ (rarely up to 2) in. long, 3–4 (rarely 6) lin. broad, 3-nerved, minutely mucronate, somewhat narrowed at the base; uppermost leaves smaller. Flowers in capitate or subcapitate terminal spikes ½–1 in. long and ¾ in. thick; bracts ovate- or elliptic-lanceolate, 4–4½ lin. long, 1½ lin. broad, slightly keeled, pilose and ciliate, acuminate or setose; bracteoles linear-lanceolate, 3¾ lin. long, otherwise as the bracts. Calyx tubular, 3¾–4¾ lin. long, sparingly pilose; teeth ovate-lanceolate to linear-triangular, 1 lin. long, setose or acuminate. Corolla rose-purple in the dried state; tube straight, somewhat funnel-shaped, 4¾–5 lin. long, pruinose, pilose at the throat inside; lobes 5, subequal, obovate, 2 lin. long, 1¾ lin. broad. Anthers acute at the apex, obtuse at the base. Style 1¼ lin. long.

Nile Land. Uganda: east side of Albert Edward Nyanza, *Scott-Elliot*, 8041!

Mozamb. Dist. German East Africa: Karagwe, 4000–5000 ft., *Scott-Elliot*, 7476! 8203! Ruchigga, *Bagshawe*, 402. Between Lakes Tanganyika and Rukwa, 6000 ft., *Nutt!* British Central Africa: Kambole, south-west of Lake Tanganyika, *Nutt!* Nyasaland; between Mpata and commencement of Tanganyika Plateau, 2000–3000 ft., *Whyte!* Nyika Plateau, 7000 ft., *Whyte!* Masuku Plateau, 6500–7000 ft., *Whyte!*

Scott-Elliot's specimens, the inflorescences particularly, have turned nearly black in drying. The calyx-teeth vary considerably in length and breadth, and are longest and narrowest in Scott-Elliot's 8041; the bracts in this are also very long and narrow.

16. **B. attenuata,** *Skan.* An annual herb about 1 ft. high; stem extremely slender, simple or slightly branched, terete, glabrous, leafless except a pair of small linear leaves 2–4 in. from the base. Basal leaves broadly ovate to oblong-lanceolate, 4–9 lin. long, 1½–4½ lin. broad, obtuse, entire or few-toothed, pilose, scabrid. Flowers in a somewhat loose narrow terminal spike, ½–¾ in. long; bracts ovate, 1¼ lin. long, ⅔ lin. broad, acuminate, minutely pubescent, ciliate, concave; bracteoles linear-lanceolate, 1⅓ lin. long, otherwise as the bracts. Calyx 2⅓–2½

lin. long, pubescent, prominently 10-nerved; teeth $\frac{2}{3}$–$\frac{3}{4}$ lin. long, subulate-lanceolate, slightly concave. Corolla violet-blue; tube cylindric, straight, 3 lin. long, sparingly pilose outside, rather densely pilose at the throat inside; lobes oblong-obovate to obovate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad. Anthers acuminate. Style $\frac{3}{4}$ lin. long. Capsule oblong-ovoid, 3 lin. long, scarcely beaked, bisulcate.—*B. Welwitschii*, Engl., forma *parviflora*, Engl. & Gilg in Baum, Kunene-Samb. Exped. 367.

Lower Guinea. Angola: Amboella; by the River Longa below Chijija, 3900 ft., *Baum*, 621 ! above Napalanka, *Baum*, 573a.

17. **B. rungwensis,** *Engl. in Engl. Jahrb.* xxx. 403. An annual herb with a strong taproot and a short rootstock emitting 2 or 3 erect densely pilose stems 6–8 in. long. Basal leaves linear-oblong, 10–12 lin. long, about $2\frac{1}{2}$–$3\frac{1}{2}$ lin. broad, obtuse, cuneate towards the base, 1-nerved; cauline leaves few (only 2 or 3 pairs in the type), linear-lanceolate to linear, 5–$7\frac{1}{2}$ lin. long, $\frac{3}{4}$–1 lin. broad, acute, sparsely pilose. Spikes $\frac{3}{4}$–$1\frac{3}{4}$ in. long, somewhat lax-flowered; bracts imbricate, lanceolate, about 5 lin. long and 1 lin. broad, rather densely pilose. Calyx 3 lin. long, rather densely pilose; teeth narrowly triangular, abont $\frac{3}{4}$ lin. long. Corolla bright violet; tube 5–6 lin. long, $\frac{1}{2}$ lin. broad, very slightly curved; lobes obovate, $3\frac{1}{2}$ lin. long, $2\frac{1}{2}$ lin. broad, the upper somewhat smaller than the others.

Mozamb. Dist. German East Africa: Rungwe Mountains, on the slopes of the highest summit, 9500 ft., *Goetze*, 1153 !

18. **B. strictissima,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 367. A very slender annual herb $1\frac{1}{4}$–$1\frac{3}{4}$ ft. high, erect; stem straight, simple or sometimes sparingly branched, glabrous except for a few scattered minute stiff hairs; internodes $\frac{1}{4}$–$\frac{1}{2}$ in. long at the base up to $1\frac{1}{2}$ in. long in the upper part of the stem. Leaves opposite, linear, 4–7 lin. long, $\frac{1}{2}$–1 lin. broad, the upper smaller, obtuse or acute, fleshy, usually with a few minute stiff hairs chiefly along the midrib and margins. Flowers in cylindric crowded terminal spikes about $1\frac{1}{4}$ in. long, which sometimes have short weak branches at the base; bracts ovate, broadly ovate or suborbicular, 1 lin. long and nearly 1 lin. broad, fleshy, apiculate, slightly pulverulent, more or less white-margined at the apex; bracteoles oblong-lanceolate, $\frac{2}{3}$ lin. long, rather acute. Calyx 1–$1\frac{1}{2}$ lin. long, minutely puberulous, fleshy; teeth $\frac{1}{4}$–$\frac{1}{3}$ lin. long, semi-ovate, rounded at the apex, minutely and hispidly ciliate, the upper tooth much smaller. Corolla rose-coloured; tube narrow, cylindric, incurved, $3\frac{1}{4}$ lin. long, glabrous outside, shortly pubescent inside; lobes obovate, 1–$1\frac{1}{2}$ lin. long and nearly 1 lin. broad, entire, bifid or denticulate. Anthers acute. Style $\frac{3}{4}$ lin. long. Capsule ellipsoid-globose, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, bisulcate, slightly emarginate.

Lower Guinea. Angola: Amboella; Kampuluve River, 3900 ft., *Baum*, 734!

19. **B. ensifolia,** *Engl. in Engl. Jahrb.* xxiii. 511. An annual herb branched from the base; stem 6–12 in. high, shortly grey-pilose;

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internodes 7½–10 lin. long. Leaves linear-lanceolate, 1¾–2 in. long, 1½–2 lin. broad, acute, entire, rather thick, 1-nerved. Flowers in a dense spike, 1¼–2 in. long; bracts ovate-lanceolate, 2–2½ lin. long, 1–1½ lin. broad, glabrous except on the ciliate margin; bracteoles linear-lanceolate, 1½–1¾ lin. long. Calyx 1½–1¾ lin. long; teeth elongate-triangular, twice shorter than the tube. Corolla-tube 3½–4 lin. long, narrowly cylindric, slightly curved; lobes obovate-oblong, about 1¼ lin. long. Capsule ovoid, 1½ lin. long.

Lower Guinea. Angola: Huilla, *Antunes*. River Palanca, *Newton*, 190.

Var. *andongensis*, Engl. in Engl. Jahrb. xxiii. 512. Leaves sparsely white pilose, especially on the margin and nerves. Calyx-teeth distinctly ciliate. Corolla-tube rather densely pilose.—Hiern in Cat. Afr. Pl. Welw. i. 776.

Lower Guinea. Angola: Pungo Andongo; on the highest mountains of the Præsidium, *Welwitsch*, 5882!

20. **B. latibracteata**, *Skan*. Apparently a tall erect annual herb; stem (upper part alone seen) slender, branched, sparingly and minutely pilose; branches alternate or subopposite, arcuate, slender, terete, about 9 in. long, scantily leafy; internodes 2½–4 lin. long. Upper leaves narrowly linear, up to 2¼ in. long, acute, scabrid, sometimes densely covered with scabrid white points. Flowers in slender cylindric terminal spikes 1–4 in. long on peduncles 1½–6 in. long; bracts broadly ovate to suborbicular, about 1 lin. long and nearly 1 lin. broad, abruptly and shortly acuminate, pilose, thick, slightly concave; bracteoles lanceolate, ¾ lin. long, concave, pilose. Calyx 2¼ lin. long, pilose; teeth subulate to narrowly deltoid, ⅔–¾ lin. long. Corolla blue; tube 4 lin. long, cylindric, slightly curved, pilose outside and at the throat inside; lobes obovate, 2¼–2½ lin. long, 1¼–1¾ lin. broad. Anthers acuminate. Style 1⅕ lin. long. Capsule oblong, 2¼ lin. long, bisulcate, apiculate.—*B. Welwitschii*, Engl. in Engl. Jahrb. xviii. 70, partly; Hiern in Cat. Afr. Pl. Welw. i. 776, partly.

Lower Guinea. Angola: Pungo Andongo; near Lombe and Condo, *Welwitsch*, 5847! Calunda Mangue, *Welwitsch*, 5859!

21. **B. crassifolia,** *Engl. in Engl. Jahrb.* xxx. 403. Rhizome short, thick, subtuberous. Stems 1 or 2, simple or branched from the base, 1–1¾ ft. long, somewhat densely leafy, minutely and bifariously pubescent; internodes 1¼–1¾ in. long. Basal leaves oblong, 1¼ in. long, 5 lin. broad, 3-nerved; cauline leaves alternate, somewhat fleshy, linear to linear-lanceolate, ¾–1½ in. long, ¾–1¾ lin. broad, acute or obtuse, narrowed at the base, entire, glabrous. Spikes solitary or more often ternate, ¾–1½ in. long, on peduncles 10 lin. long, rather loose; lateral spikes smaller than the terminal; bracts lanceolate from a broad base, 3–5 lin. long, 1–1½ lin. broad, ciliate; bracteoles linear or linear-lanceolate, acute, a little shorter than the bracts. Calyx 3–4½ lin. long, 4-toothed, sparingly and minutely pubescent, somewhat scarious; teeth elongate-triangular, ½–1⅔ lin. long. Corolla bright blue, white at the throat, densely and shortly white-pilose; tube 5–6 lin. long, ½ lin. broad, straight, cylindric except at the somewhat funnel-shaped throat;

lobes obovate or oblong, $2\frac{1}{4}$–3 lin. long, $\frac{2}{3}$–2 lin. broad. Style $1\frac{1}{2}$ lin. long. Capsule narrowly oblong, $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long; valves recurved.

Mozamb. Dist. German East Africa: Kinga (Livingstone) Mountains; Kirunde Mountain, 6600 ft., *Goetze*, 899! British Central Africa: Nyasaland, *Whyte!*

22. **B. namuliensis,** *Skan.* Stem erect, 1 ft. high or more, simple below, sparingly branched above, quadrangular, few-leaved, puberulous. Lower leaves wanting; upper leaves alternate, linear to linear-lanceolate, up to $1\frac{1}{2}$ in. long and $1\frac{1}{2}$ lin. broad, entire, sparingly hispidly pubescent. Spikes terminal or sometimes lateral, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, rather densely flowered, elongating and becoming lax in fruit; bracts broadly lanceolate, acuminate, $2\frac{1}{2}$ lin. long, concave, shortly pilose; bracteoles linear, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, acuminate. Calyx $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, distinctly 10-nerved, 5-toothed, somewhat hispidly hairy; teeth linear-triangular, about $\frac{3}{4}$ lin. long. Corolla-tube about 5 lin. long, narrow, slightly curved, very sparingly hairy on the upper part outside; lobes obovate, about 2 lin. long and $1\frac{1}{2}$ lin. broad. Anthers acuminate. Style nearly 2 lin. long. Capsule ellipsoid, slightly curved, 2 lin. long, minutely apiculate.

Mozamb. Dist. Portuguese East Africa: Makua Country: Namuli Hills, *Last!*

23. **B. Welwitschii,** *Engl. in Engl. Jahrb.* xviii. 70, *t.* 3, *fig. F, partly.* An erect annual herb $1\frac{1}{4}$–$1\frac{3}{4}$ ft. high or more, sparingly covered with slender grey hairs; stem simple or sparingly branched, slender, rather leafy; internodes about $\frac{1}{2}$ in. long at the base, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long above. Basal leaves elliptic-oblong, 5–10 lin. long, 4–5 lin. broad, obtuse, sparingly and irregularly toothed, scabrid with minute white points; upper leaves opposite or subopposite, sessile, oblong-linear to linear, about $1\frac{1}{4}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ lin. broad, acute, narrowed at the base, entire or minutely few-toothed, somewhat scabrid, grey-pilose. Flowers in a terminal rather crowded spike about $\frac{3}{4}$ in. long; bracts lanceolate, 3–$3\frac{1}{4}$ lin. long, concave, pilose; bracteoles linear or subulate, $1\frac{1}{2}$–2 lin. long, pilose. Calyx $2\frac{1}{2}$–3 lin. long, pilose; teeth unequal, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long, subulate. Corolla deep blue; tube $4\frac{1}{2}$ lin. long, sparingly pilose outside, rather densely pilose at the throat inside, cylindric, straight; lobes obovate, 2–$2\frac{1}{2}$ lin. long, $1\frac{1}{4}$–2 lin. broad, the lower larger than the upper. Anthers acuminate. Style 1–$1\frac{1}{2}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 776, partly.

Lower Guinea. Angola: Humpata Plateau, *Welwitsch*, 5832!

Var. *elata*, Hiern in Cat. Afr. Pl. Welw. i. 776. Stem 2–3 ft. high, more leafy than in the type. Leaves oblong to linear-oblong or the uppermost linear, up to 3 in. long and $\frac{1}{2}$ in. broad, remotely toothed, very scabrid. Corolla pale blue.

Lower Guinea. Angola: Mossamedes; by the River Maimbo, *Welwitsch*, 5827!

24. **B. reissiana,** *Buettner ex Engl. in Engl. Jahrb.* xviii. 68, *t.* 3, *fig. K.* A very slender herb about $1\frac{1}{2}$ ft. high; stem simple below, sparingly branched above, terete, $\frac{1}{2}$ lin. in diam., few-leaved (about 3 pairs at the base and a few small alternate ones near the apex). Leaves of the lowest pair oblong-lanceolate, 1 in. long, 3–4 lin. broad,

obtuse, and of the other pairs linear-lanceolate, 1¼–1½ in. long, 1½–2½ lin. broad, acute, entire or having a few small teeth. Spike terminal, about ¾ in. long, rather densely-flowered, densely white-pubescent; bracts lanceolate, acuminate, about ¼ in. long; bracteoles similar in shape but much smaller. Calyx about ¼ in. long; 5-toothed; teeth subulate, 1–1¼ lin. long. Corolla-tube about ⅓ in. long, densely and shortly pubescent; lobes obovate-spathulate, 2½ lin. long, ¾ lin. broad. —Engl. & Gilg in Baum, Kunene-Samb. Exped. 366; Durand & Schinz, Études Fl. Congo, i. 212.

Lower Guinea. Angola: between Goudkopje and Kakele, 3900 ft., *Baum*, 185; River Chimpungu, 4600 ft., *Baum*, 864!

South Central. Congo Free State: Lukolela and Equatorville, *Buettner*.

25. **B. Randii,** *S. Moore in Journ. Bot.* 1900, 467. An erect plant 6⅔–14½ in. high; stem attenuated, scarcely ½ lin. in diam., sparingly leafy, pilose-hispid; internodes 1¾–3 in. long. Radical leaves ovate or ovate-oblong, 5–10 lin. long, 2½–3 lin. broad, obtuse; cauline leaves narrowly linear, 10–15 lin. long, the upper smaller, obtuse. Spikes dense-flowered, somewhat more than 5 lin. long; bracts ovate-lanceolate, acute, hispid, the medium-sized ones 2½ lin. long; bracteoles setaceous, scarcely 1½ lin. long. Calyx tubular, 2½ lin. long, hispid, obscurely nerved; teeth triangular-setaceous, scarcely ¾ lin. long. Corolla 4½ lin. long; tube attenuated, straight, somewhat pilose; limb not more than 1½ lin. in diam.; lobes obovate-oblong, very obtuse, almost equal.

Mozamb. Dist. British Central Africa: Rhodesia; Salisbury, *Rand*, 573!

26. **B. Poggei,** *Engl. in Engl. Jahrb.* xviii. 69, *t.* 3, *fig. E.* An annual herb; stem about 1 ft. long bearing only 2 leaves at the middle and others approximated at the base; internodes very much elongated. Basal leaves oblong-lanceolate, 7½–10 lin. long, entire or undulate-dentate, 3-nerved, long and sparsely hispid-pilose; cauline leaves linear-lanceolate, about 10 lin. long, sparsely hispid-pilose. Spike short, the lower flowers much longer than the buds at the end; bracts lanceolate, 1½ lin. long and ¾ lin. broad, long and sparsely hispid-pilose. Calyx 3 lin. long, hispid; teeth triangular, acute, ½ lin. long. Corolla-tube nearly 5 lin. long, ½ lin. broad, slender, slightly curved, finely pilose; lobes oblong, glabrous, deep violet-blue, the lower 2½ lin. long and 1¾ lin. broad.

South Central. Lunda: Kimbundo, on the River Lovo, *Pogge*, 315.

27. **B. albiflora,** *Skan.* A rigid erect herb 1¼ ft. high, having the stem and branches rather densely pilose with very slender grey hairs; stem simple below, branched about the middle, terete, about 1½ lin. thick at the base; branches 5–7½ in. long, erect-spreading, few-leaved. Basal leaves narrowly obovate, 8 lin. long, 4 lin. broad, obtuse, scabrid with short white hairs much thickened at the base; upper leaves opposite or alternate, narrowly lanceolate, ¾–2½ in. long, 1–3 lin. broad, obtuse or somewhat acute, entire, scabrid with short white hairs

much thickened at the base. Spikes terminal, thick and densely-flowered in the upper part, interrupted below, $3\frac{1}{2}$–$4\frac{1}{2}$ in. long, sometimes with very short axillary spikes in the axils of the uppermost leaves; bracts ovate-elliptic about 2 lin. long and 1 lin. broad, acute, ciliate; bracteoles linear-lanceolate, $1\frac{1}{2}$ lin. long, acuminate, sparingly ciliate. Calyx 2 lin. long, pubescent, 10-nerved, becoming scarious, 5-toothed; teeth narrowly deltoid, $\frac{2}{3}$ lin. long, acute. Corolla white; tube $2\frac{1}{2}$ lin. long, cylindric, straight, very sparingly white-pubescent outside; lobes obovate, $\frac{1}{3}$–$\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad. Anthers acute. Style about $\frac{1}{2}$ lin. long. Capsule ovoid-oblong, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, apiculate.

Mozamb. Dist, British Central Africa: Nyasaland; Mount Masisi, 4500 ft., *McClounie*, 75!

28. **B. Verdickii,** *Skan.* A small plant only $1\frac{1}{2}$–$2\frac{3}{4}$ in. high, more or less strongly branched from the base; branches hairy. Leaves sessile, lanceolate or linear, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, $\frac{3}{4}$–$3\frac{1}{2}$ lin. broad, scabridly hairy on both sides. Inflorescence a terminal spike $7\frac{1}{2}$ lin. to $1\frac{3}{4}$ in. long; flowers rather numerous but somewhat loosely arranged, the lower sometimes distant; lower bracts like the leaves, exceeding the flowers; upper bracts shorter than the calyx; bracteoles lanceolate, acute, hairy, about $1\frac{1}{2}$ lin. long. Calyx hairy, about 5 lin. long, slightly accrescent, 4–5-toothed; teeth linear, acute, about 1 lin. long, 1 tooth often much reduced. Corolla-tube about as long as the calyx, pubescent; lobes obovate, about $2\frac{1}{2}$ lin. long and $\frac{3}{4}$ lin. broad. Fruit oblong, about $2\frac{1}{2}$ lin. long and $\frac{3}{4}$ lin. thick, apiculate.—*B. pusilla*, De Wild. Études Fl. Katanga, 123, not of H. B. and K.

South Central. Congo Free State: Katanga; Lukafu, *Verdick*, 574.

29. **B. Nuttii,** *Skan.* A rigid erect minutely pubescent scabrid herb $1\frac{1}{2}$ ft. high or more, blue-black in the dried state; stems apparently simple (the lower parts have not been seen), $1\frac{1}{4}$–$1\frac{1}{2}$ lin. thick, sparingly leafy; internodes up to $2\frac{1}{2}$ in. long. Upper leaves opposite or sub-opposite, lanceolate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, acute, narrowed at the base, 3-nerved. Flowers in dense irregular axillary shortly stalked or sessile compound heads about $\frac{3}{4}$ in. long and $\frac{1}{2}$ in. broad; bracts lanceolate, $2\frac{1}{4}$ lin. long, keeled, acuminate, ciliate; bracteoles linear, $1\frac{2}{3}$ lin. long, otherwise as the bracts. Calyx 2 lin. long, sparingly pubescent outside, glandular-pulverulent inside; teeth ovate-lanceolate, about $\frac{3}{4}$ lin. long, acuminate, ciliate. Corolla-tube somewhat funnel-shaped, rather broad, $2\frac{3}{4}$ lin. long, very sparingly pilose outside, densely pilose inside, straight or very slightly curved; lobes 5, subequal, obovate, about 1 lin. long and $\frac{3}{4}$ lin. broad, somewhat crisped. Anthers obtuse. Style scarcely $\frac{1}{2}$ lin. long.

Mozamb. Dist. British Central Africa: Urungu; Fwambo, 5250 ft., *Nutt!*

30. **B. andongensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 775. An erect annual herb more than 8 in. high, branched from the base; branches obtusely tetragonal, hispidulous-scabrid; some of the upper internodes exceeding the leaves. Leaves mostly opposite, obovate-oblong, $\frac{2}{3}$–3 in. long, $\frac{1}{4}$–1 in. broad, obtuse or subapiculate, cuneate at

the sessile or subsessile base, entire or obsoletely denticulate, membranous, scabrid, 3-nerved. Spikes terminal, sessile, compound at the base, semi-ellipsoid, many-flowered, 6–8 lin. long, forming a corymb; flowers whitish, 3–4 lin. long, sessile or subsessile; bracts about as long as the calyx, oblong or ovate, glabrous inside, ciliate, somewhat hispid on the back; bracteoles about as long as the bracts but narrower, ciliate. Calyx $2\frac{1}{2}$–3 lin. long, ribbed or angled, ciliate on some of the ribs or angles, shortly 5-toothed; teeth lanceolate or ovate-lanceolate, ciliate, somewhat unequal. Corolla-tube rather slender, as long as the calyx, straight or somewhat curved near the apex; limb rather small. Anthers acute. Style $\frac{3}{4}$ lin. long. Capsule 2 lin. long.

Lower Guinea. Angola: Pungo Andongo; in the forest between Cazella and Zambe, *Welwitsch*, 5850!

31. **B. foliosa,** *Skan.* A robust erect herb 9 in. high or more; stem simple below, corymbosely branched above, obscurely quadrangular, slightly bisulcate, about $1\frac{1}{2}$ lin. thick, more than usually leafy for the genus, glabrescent in places, more or less covered here and there with rather long hispid grey somewhat adpressed hairs; branches opposite, $\frac{1}{2}$–$3\frac{1}{4}$ in. long, the lowermost longest, erect-spreading. Leaves opposite, oblong below to lanceolate above, $1\frac{1}{4}$–$2\frac{3}{4}$ in. long, 3–9 lin. broad, acute, much narrowed at the base, entire or remotely toothed, 3-nerved, sparsely pubescent, the hairs often very short and stiff. Spikes terminal, corymbosely arranged, ovoid, 8–10 lin. long, about 7 lin. broad, densely-flowered, compound at the base; lowermost bracts leaf-like, lanceolate, up to 1 in. long; upper bracts ovate-elliptic, 3–$3\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, acute or acuminate, rounded or flattened on the back, sometimes sharply keeled at the apex, prominently 3-ribbed, pubescent; bracteoles lanceolate, $2\frac{1}{2}$ lin. long, keeled, pubescent. Calyx 3–$3\frac{1}{2}$ lin. long, somewhat quadrangular, 4-toothed, rather deeply slit down on the upper and lower sides, hispidly hairy; teeth about $\frac{3}{4}$ lin. long, narrowly deltoid, acute. Corolla-tube $3\frac{1}{2}$ lin. long, narrow, cylindric, straight, sparingly pubescent outside; lobes obovate or obovate-cuneate, about 1 lin. long and broad. Anthers acute. Style $\frac{1}{3}$ lin. long. Capsule ovoid, $2\frac{1}{2}$–3 lin. long, apiculate.

Mozamb. Dist. British Central Africa: Nyasaland; Tanganyika Plateau, at Fort Hill, 3500–4000 ft., *Whyte!*

32. **B. nitida,** *Skan.* An erect annual herb about 6 in. high; stem simple, terete, rather woody, about $\frac{2}{3}$ lin. thick, bifariously puberulous, leafless below, sparingly leafy above. Leaves opposite, sessile, linear-lanceolate, 6–8 lin. long, 1–$1\frac{1}{4}$ lin. broad, acute, glabrous, smooth, shining, somewhat coriaceous. Flowers sessile in a shortly branched flattened terminal head about 1 in. broad; bracts ovate or elliptic to oblong-lanceolate, $2\frac{1}{4}$–$3\frac{1}{4}$ lin. long, $1\frac{1}{4}$ lin. broad, acute or acuminate, somewhat concave, glabrous; bracteoles $2\frac{1}{2}$ lin. long, linear-lanceolate, glabrous. Calyx 4 lin. long, deeply slit in the median plane into 2-toothed halves; teeth narrowly ovate, acuminate, $\frac{1}{2}$–$\frac{2}{3}$ lin. long. Corolla-tube 4–$4\frac{1}{2}$ lin. long, glabrous outside, with thick stiff hairs inside; lobes

obovate, 1¾–3 lin. long, 1½–2½ lin. broad. Anthers acute. Style 1⅕ lin. long.

Mozamb. Dist. British Central Africa: Nyasaland; *McClounie*, 123, partly!

33. **B. nigricans,** *Skan.* An erect rather rigid annual branched herb about 1 ft. high, drying black, shortly and hispidly pubescent. Leaves subsessile, opposite, linear-lanceolate, up to 1½ in. long and 2 lin. broad, acute, entire, hispidly pubescent, scabrid. Spikes terminal, uninterrupted, somewhat densely-flowered, slender, cylindric, 1½–2 in. long; bracts quadrifariously imbricate, ovate, elliptic or somewhat rhomboid, up to 2 lin. long and 1¼ lin. broad, acute, pilose, slightly keeled; bracteoles lanceolate, 1½–1¾ lin. long, acute, pilose. Calyx about 2¾ lin. long, scarious, 7–8-nerved, 4-toothed, deeply slit down on the upper side, pilose on the upper part chiefly on the teeth; teeth ovate or deltoid, acuminate, ½–¾ lin. long. Corolla at first glossy yellow, turning to green and finally to black when dry (*Welwitsch*); tube about 4 lin. long and ½ lin. broad, curved, slightly contracted at the throat, minutely and sparingly pilose above; limb stellate; lobes narrowly oblong, about 1¼ lin. long, fleshy, undulate, somewhat involute along the margins or conduplicate in the dried state. Anthers rather obtuse. Style about 1¾ lin. long. Capsule cylindric-oblong.—*Stellularia nigricans*, Benth. in Hook. Ic. Pl. t. 1318. *S. nigrescens*, Benth. l.c.; Hiern in Cat. Afr. Pl. Welw. i. 774, partly. *Benthamistella nigricans*, O. Kuntze, Rev. Gen. Pl. ii. 458.

Lower Guinea. Angola: Huilla; near Catumba, *Welwitsch*, 5838!

34. **B. benthamiana,** *Skan.* The following characters distinguish this from *B. nigricans:* Leaves narrowly linear. Spike 5 in. long, more slender, less densely-flowered; bracts lanceolate, 2½–3 lin. long, acuminate, rather more pilose. Calyx slightly narrower, more pilose; teeth narrower and longer. Corolla at first purple, then greenish, black when dry (*Welwitsch*), otherwise the same. Style 1 lin. long.—*Stellularia nigrescens*, Hiern in Cat. Afr. Pl. Welw. i. 774, partly. See note by Bentham in Hook. Ic. Pl. xiv. 13, under t. 1318.

Lower Guinea. Angola: Huilla; in herbaceous thickets at Monino, *Welwitsch*, 5537.

35. **B. inflata,** *Skan.* A slender erect herb 10–12 in. high, drying black. Leaves opposite, sessile, linear, about 7½–15 lin. long and 1 lin. broad, entire, pubescent, scabrid. Spikes cylindric, terminating the somewhat numerous branches of the stem, 1¾–4 in. long, shortly pedunculate; bracts elliptic, up to 3½ lin. long and 1½ lin. broad, pilose, scabrid, ciliate, acute; flowers sessile. Calyx tubular, 3¾ lin. long, 7- or 8-nerved, 4-toothed; teeth acute, pilose outside, ciliate. Corolla-tube slender, 5–6 lin. long, erect, not bent, very narrow, slightly inflated above the calyx; lobes linear, about 1 lin. long, recurved on the margins. Style elongated. Capsule elliptic, 2¼ lin. long and slightly more than

½ lin. broad, laterally compressed.—*Stellularia inflata*, De Wild. Études Fl. Katanga, 124.

South Central. Congo Free State: Katanga; Manioue, on the Upper Lualaba River, *Briart*.

36. **B. tuberosa**, *Skan*. Plant tuberous-rooted, 6–15 in. high, closely resembling *B. Lastii* and *B. similis*; stems freely branched. Leaves linear-lanceolate, up to 1½ in. long and 1¾ lin. broad, acuminate, glabrous, or minutely and sparingly ciliate. Spikes very slender, uninterrupted except sometimes the lowermost pair of flowers is shortly separated from the rest, almost as in *B. similis*, but the bracts are more closely adpressed; bracts lanceolate, 3–4 lin. long, acuminate, ciliate; bracteoles linear, about 2 lin. long, ciliate. Calyx as in *B. similis*, but 3–4 lin. long. Corolla chocolate colour; tube up to 7 lin. long (much longer than the calyx), otherwise as in *B. similis*; lobes oblong, about 1 lin. long and ½–⅔ lin. broad, thick, involute along the margins in the dried state. Style 2¾ lin. long. Capsule narrowly oblong, 4–4½ lin. long.

Mozamb. Dist. British Central Africa: Nyasaland; Tuchila Plateau, Mount Mlanji, 6000 ft., *Purves*, 21!

37. **B. usuiensis**, *Oliv. in Trans. Linn. Soc.* xxix. 121, *t.* 122, *fig. C*. An erect herb 1½–2 ft. high, sparingly branched from the woody base; branches terete, leafy, rather densely covered with grey pubescence; internodes 4–6 lin. long. Leaves opposite or the upper subopposite, sessile, lanceolate or the upper linear-lanceolate, ¾–1¼ in. long, 2–3 lin. broad, acute, glabrous or with a few minute scabrid hairs on the midrib and margins, 1-nerved. Flowers in slender imbricate spikes 3–6 in. long; bracts linear-lanceolate or boat-shaped, ⅔ in. long; 1½ lin. broad, acuminate, sparingly pubescent, becoming rigid in fruit; bracteoles ½ in. long, similar to the bracts but much narrower. Calyx ½ in. long, sparingly pubescent; teeth subulate, 1⅔–1¾ lin. long, the upper tooth smaller, acute, ciliate. Corolla-tube 7½ lin. long, cylindric, curved, narrow, minutely pubescent inside and outside, having numerous stiff hairs at the throat inside and a few on the lobes; lobes obovate, 2½ lin. long, 1½ lin. broad, slightly toothed. Anthers acute. Style 3½ lin. long. Capsule oblong, about 3 lin. long, shortly beaked, bisulcate. —*Striga senegalensis*, T. Thoms. in Speke, Nile, Append. 642, not of Benth.

Mozamb. Dist. German East Africa: Usui, 4500 ft., *Speke & Grant*, 204!

38. **B. similis**, *Skan*. Closely resembles *B. Lastii* in stems and leaves, but in every example seen the stems are simple, and as many as 9 arise from the common woody rootstock, Spikes terminal, up to 4 in. long or more, rather loose but uninterrupted except that the 1 or 2 lowermost pairs of flowers are shortly separated from the rest; bracts lanceolate, acuminate, 4–5¼ lin. long, about 1 lin. broad, glabrous except on the very sparingly ciliate margins, slightly keeled; bracteoles

linear, acuminate, 2½–3¼ lin. long, sparingly ciliate. Calyx 4½–5 lin. long, glabrous except the sparingly ciliate teeth, somewhat scarious, irregularly 10-nerved, 5-toothed; teeth ovate-triangular to linear-triangular, acuminate or setaceous at the tips, ¾–1¼ lin. long, the uppermost smallest, and the lateral approximate in pairs. Corolla white, glabrous outside; tube curved from base to throat, cylindric, ⅓–½ in. long (not longer or only a little longer than the calyx), about ½ lin. broad; lobes oblong, 2–2½ lin. long, ¾–1 lin. broad, usually flat. Anthers acute. Style 1½–2¼ lin. long. Capsule linear-oblong, 3½ lin. long, 1¼ lin. broad.

Mozamb. Dist. British Central Africa: Nyasaland: between Kondowe and Karonga, 2000–6000 ft., *Whyte!* Mount Mlanji, *Whyte!*

39. **B. Lastii,** *Engl. Pfl. Ost-Afr. C.* 359. An erect undershrub 1–1¼ ft. high, drying black; stems 2 or more arising from a short thickened woody rootstock, simple or rather freely branched chiefly near the base, terete or somewhat angular, ¾–1 lin. thick, bifariously and minutely pubescent; internodes ¾–1½ in. long. Leaves mostly opposite, sessile, lanceolate, 7–14 lin. long, 1½–2¾ lin. broad, acute, glabrous, rather thick, entire or minutely denticulate. Spikes terminal, slender, 3–6 in. long; lower flowers in distant pairs (8–18 lin. apart) and the upper pairs much closer and imbricate in bud; lowermost bracts like the upper leaves; upper bracts broadly lanceolate, 3–5 lin. long, 1–1½ lin. broad, acute, concave, very sparingly ciliate; bracteoles very narrowly linear, 2½ lin. long, very sparingly ciliate. Calyx 3½–3¾ lin. long, scarious, glabrous except the ciliate teeth, unequally 9- or 10-nerved, 5-toothed; teeth very irregular, lanceolate or narrowly triangular, acuminate, the longest 1¼ lin. long, the shortest about ½ lin. long. Corolla yellow-green or brown when dry, glabrous outside; tube curved from base to throat, 4¼–4½ lin. long, slightly and equally dilated near the apex; lobes oblong, 1¼ lin. long, ½ lin. broad. Anthers acute. Style 1¼ lin. long. Capsule narrowly ovoid-ellipsoid, about 2 lin. long. —*B. kingaensis*, Engl. in Engl. Jahrb. xxx. 404.

Mozamb. Dist. German East Africa: Kinga Mountains; south-west slope of the Pikurugwe ridge, 8200 ft., *Goetze*, 1242! Portuguese East Africa: Makua Country; Namuli Hills, *Last!*

40. **B. fulgens,** *Engl. in Engl. Jahrb.* xxviii. 478. A rather slender erect branched herb about 1¾ ft. high, shortly and hispidly pubescent; stems leafless at the base, terete; internodes ½–2 in. long; branches often very slender and elongated, ascending. Leaves opposite or the upper subopposite, sessile, narrowly linear to linear-lanceolate, 1–10 lin. long, ⅓–1 lin. broad, obtuse, much narrowed at the base. Inflorescence a lax few-flowered terminal spike or raceme; flowers alternate, opposite or subopposite; bracts broadly lanceolate, 1–1⅓ lin. long, concave, shortly acuminate, almost glabrous on the back, ciliate; pedicels 0–2 lin. long; bracteoles linear, ½–1 lin. long. Calyx 3½–4½ lin. long, strongly 10-ribbed, sparingly and minutely pubescent outside, rather densely pubescent on the teeth inside; teeth lanceolate-triangular,

½–1 lin. long, acute. Corolla bright scarlet or orange-red; tube about ⅖ lin. long, very narrow, cylindric, curved near the top, ribbed, nearly glabrous outside, pilose inside chiefly at the throat; lobes obovate or the upper obovate-rhomboid, 3–5 lin. long, 1½–3½ lin. broad, slightly and irregularly toothed, very sparingly ciliate below. Anthers acute. Style 1 lin. long. Capsule oblong, about 3 lin. long.

Mozamb Dist. German East Africa: Uhehe; near Tengulingi, *Goetze*, 697! Lower plateau, north of Lake Nyasa, *Thomson!*

This plant yields a green colouring matter when macerated in water.

41. **B. Baumii,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 367. An erect annual herb 1–1¾ ft. high, sparingly and minutely pubescent (often bifariously on the stem and branches); stem terete, sparingly branched, and with very short leafy branches in the axils of the leaves; longer branches erect-spreading. Lower leaves rosulate, obovate, lanceolate or oblanceolate, ¾–1¾ in. long, 3–4½ lin. broad, obtuse, cuneate at the base, minutely and sparingly pubescent and ciliate, thickened scabrid and revolute on the margins; upper leaves linear, mostly narrowly linear or filiform, ¾–1¼ in. long, ¼–¾ lin. broad, obtuse, minutely pubescent, somewhat scabrid. Spikes terminal, dense at the apex, often interrupted below and elongating after flowering; bracts ovate to ovate-lanceolate, 1–1¾ lin. long, ½–⅔ lin. broad, acute or acuminate, sparingly and shortly ciliate, nearly glabrous on the back, somewhat keeled; bracteoles linear-lanceolate, ¾–⅘ lin. long. Calyx 2½–3¼ lin. long, shortly and sparingly pilose, 10-nerved; teeth narrowly deltoid to subulate, ⅓–¾ lin. long, the uppermost tooth minute. Corolla bluish; tube 4–4½ lin. long, very narrow, cylindric, straight, pilose outside, densely pilose at the throat inside; lobes obovate, 1¾–2½ lin. long, 1–1½ lin. broad. Anthers acuminate. Style ⅘ lin. long.

Lower Guinea. Angola: Amboella; between Kassinga and the River Kubango, 4600 ft., *Baum*, 225!

42. **B. humpatensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 777. A slender erect branched annual herb 9–12 in. high, glabrous except some small callous scales chiefly on the leaves; stem angular, usually bright purple-red; branches opposite or the upper alternate, ascending. Leaves opposite or the upper alternate, lanceolate or linear-lanceolate, up to 1½ in. long and ¼ in. broad, acute, slightly narrowed at the base, 1-nerved, sprinkled over and bordered with callous points. Flowers subsessile, usually opposite (the pairs about ½ in. apart), in terminal spikes 2–6 in. long; bracts broadly ovate or ovate-elliptic, 1½–3 lin. long, concave, minutely 2- or 3-toothed at the apex, glabrous or nearly so; bracteoles 0. Calyx 1¼–2 lin. long, slightly puberulous; tube campanulate-oblong; teeth about ¼ lin. long, ovate, acute. Corolla-tube nearly cylindric, scarcely curved, green, 1⅓ lin. long, glabrous; lobes 5, somewhat unequal, narrowly obovate, about ½ lin. long. Anthers obtuse. Style scarcely more than ¼ lin. long. Capsule 1¾–2 lin. long, ellipsoid, bisulcate, slightly emarginate.

Lower Guinea. Angola: Huilla; in the damp pastures of Humpata and Nene, *Welwitsch*, 5798!

43. **B. leptostachya,** *Benth. in DC. Prodr.* x. 497. A somewhat slender erect herb 1–2½ ft. high, usually branched in the upper part, glabrescent or very sparingly sprinkled with minute hairs, often scabrid with minute white points on the leaves; stems and branches terete, with long internodes. Lower leaves elliptic, oblong or obovate, up to 3 in. long and 1¼ in. broad, obtuse; upper leaves from linear-oblong to linear, 1–1¾ in. long, 1½–4 lin. broad, obtuse or acute. Flowers in loose interrupted terminal spikes often from 6–9 in. long, very shortly pedicellate; bracts ovate-lanceolate, ovate or ovate-elliptic, 1⅓–2¼ lin. long, acute or acuminate, concave, shortly hairy or glabrous except on the ciliate margin; bracteoles linear to linear-lanceolate, ⅔–2 lin. long, acute, otherwise as the bracts. Calyx 2¼–4¼ lin. long, 10-ribbed or -nerved, 5-toothed, nearly glabrous except for a few hairs on the teeth; teeth narrowly deltoid to linear-triangular, ½–1⅓ lin. long, acute. Corolla dull blue purple or white; tube 2¾–4 lin. long, glabrous or with a few short hairs near the throat outside, pilose inside, straight, cylindric; lobes obovate, ⅔–1½ lin. long, ½–1 lin. broad. Anthers acute. Style ⅔–1¼ lin. long. Capsule narrowly oblong, 2¾–3½ lin. long, minutely apiculate.—Vatke in Oest. Bot. Zeitschr. 1875, 11. *B. mossambicensis,* Klotzsch in Peters, Reise Mossamb. Bot. 224, t. 34; Vatke in Linnæa, xliii. 309. *B. mossambicensis,* var. *usafuensis,* Engl. in Engl. Jahrb. xxx. 404.

Upper Guinea. Senegambia, *Leprieur,* 7! 613! Gambia, *Brown-Lester,* 42! French Guinea: Wallia, *Scott-Elliot,* 4266! Northern Nigeria: Nupe, *Barter,* 907!

Nile Land. British East Africa: Ribe to Galla Country, *Wakefield!*

Mozamb. Dist. Zanzibar: Hokotoni, *Hildebrandt,* 1127! German East Africa: Dar-es-Salaam, *Hildebrandt,* 1221! Usafua; Songwe Valley, 3600 ft., *Goetze,* 1053. Portuguese East Africa: Kerimka Islands, *Peters.* British Central Africa: Nyasaland; Fort Hill, Tanganyika Plateau, 3500–4000 ft., *Whyte!*

44. **B. speciosa,** *Skan.* An erect branched rather rigid undershrub, perhaps the largest-flowered species of the genus, drying black; stem up to 4 ft. high, terete, often glaucous, sparingly pubescent in places and densely bifariously pubescent in others or glabrescent, scabrid here and there with the much-thickened bases of small hairs; branches erect-spreading, slender, opposite or subopposite, glaucous, quite glabrous or sparingly covered with short fine hairs thickened at the base. Leaves opposite or subopposite, distant, lanceolate or oblanceolate, up to 1¾ in. long and 4½ lin. broad, narrowed to the base, very slightly narrowed at the apex, minutely apiculate, entire, covered with stiff adpressed hairs on both sides, often with a tuft of smaller leaves in their axils. Spikes or racemes interrupted, terminal, up to 9 in. long; flowers mostly in pairs ½–¾ in. apart, shortly pedicellate; bracts ovate-lanceolate, about 3 lin. long, 1 lin. broad at the base, shortly acuminate, thinly covered with short stiff hairs on the upper side, sparingly ciliate; bracteoles linear-lanceolate, 2–2¼ lin. long. Calyx 5½ lin. long, 1½ lin. broad above, slightly narrower below, somewhat curved, glabrous outside, covered with short stiff adpressed hairs on the upper part inside, 10-ribbed;

teeth 5, ovate-lanceolate, 1⅔ lin. long, sparingly ciliate, shortly acuminate, the uppermost slightly narrower than the others. Corolla white, funnel-shaped; tube 8 lin. long, 1 lin. broad, straight or slightly curved, glabrous outside, long-pilose at the throat inside; lobes nearly equal, suborbicular, 5 lin. in diam., overlapping at the margin. Anthers acuminate. Style 1¼ lin. long, much thickened in the upper part. Capsule ellipsoid or oblong, 4 lin. long, nearly 2 lin. broad at the base, slightly narrower above, slightly curved, very shortly apiculate.

Mozamb. Dist. British Central Africa: Nyasaland, 4000–7000 ft.; near Mount Masisi, *McClounie*, 123 partly! Masuku Plateau, *Whyte!* Nyika Plateau, *Whyte!*

45. **B. longespicata,** *Schinz in Verh. Bot. Ver. Brandenb.* xxxi. 193. A strigose annual herb 1 ft. high or more, sparingly or often much branched from the woody base; branches slender, subterete, somewhat rigid, erect-spreading, leafy especially at the base. Leaves opposite, subopposite or sometimes alternate, sessile or very shortly petiolate, linear to linear-lanceolate, up to 1¾ in. long, ¾–2½ lin. broad, obtuse or somewhat acute, narrowed at the base, entire, densely covered with short hispid hairs, which are often thickened at the base, scabrid. Spikes terminal, with the flowers crowded at the apex, becoming very lax and growing out up to 8 in. long in the fruiting stage, distinctly tapering at the apex some distance beyond the opened flowers; flowers opposite or subopposite, subdistichous; lower bracts leaflike, lanceolate or linear-lanceolate, 5–6 lin. long; upper bracts ovate-lanceolate or lanceolate, about 1½ lin. long and ½ lin. broad, acute or acuminate, shortly white-pilose; bracteoles linear-lanceolate. Calyx 2½–3 lin. long, densely white-pilose, 5-toothed, 10-nerved; hairs more or less distinctly reflexed; teeth subulate or narrowly triangular, about ⅔ lin. long, spreading after flowering. Corolla apparently violet-blue; tube funnel-shaped, slightly oblique and curved, 4–4½ lin. long, ½ lin. broad at the base, 1–1¼ lin. broad at the throat, adpressed-pilose outside, densely pilose at the throat inside; lobes unequal, oblong-obovate to obovate, 1¾–3¼ lin. long, 1–2 lin. broad, the lower larger than the upper. Anthers acuminate. Style 1¼ lin. long, clavate at the apex. Capsules oblong, 2–2½ lin. long, ¾ lin. broad, mostly in pairs about ½ in. apart, rarely up to 1 in. or more apart.

Lower Guinea. German South-west Africa: Amboland; Grootfontein, *Schinz*, 40! Omatope, *Schinz*, 356!

46. **B. pallescens,** *Engl. in Engl. Jahrb.* xxiii. 512. An erect annual herb 1½–1¾ ft. high, rather slender, sparingly pilose, scabrid on the leaves; stem terete, sometimes branched in the upper part, and bearing very short leafy branches in many of the leaf-axils. Leaves alternate, linear, 1–2½ in. long, ¾–2 lin. broad, acute, entire or remotely toothed. Flowers in loose spikes terminating the stem and short lateral branches, the spikes elongating very much after the fall of the corollas; bracts ovate-lanceolate, 1¾ lin. long, ½ lin. broad, acuminate, shortly pilose, ciliate, concave; bracteoles linear, 1¼ lin. long, otherwise as the

bracts. Calyx $\frac{1}{4}$ in. long, shortly pilose, distinctly 10-nerved; teeth narrowly deltoid to linear-triangular, $\frac{1}{2}$–$\frac{2}{3}$ lin. long, acute or acuminate, ciliate. Corolla deep blue; tube $4\frac{1}{2}$–5 lin. long, cylindric, straight, very sparingly pilose outside, rather densely pilose at the throat inside; lobes obovate, about 2 lin. long, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. broad. Anthers acuminate. Style about 1 lin. long. Capsule ovoid, $2\frac{1}{4}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 775.

Lower Guinea. Angola: Mossamedes; about the River Bero, *Welwitsch*, 5825! banks of the River Maiombo, *Welwitsch*, 5826! Huilla; Chella Mountains, *Johnston!*

47. **B. Henriquesii,** *Engl. in Engl. Jahrb.* xviii. 69, *t.* 3, *fig. B.* A dwarf more or less hispid-pilose apparently annual herb usually much branched from the woody base; branches ascending, 3–6 (rarely up to 10) in. long, leafy. Leaves linear or lanceolate, $\frac{1}{3}$–$1\frac{3}{4}$ (usually $\frac{3}{4}$–1) in. long, $\frac{1}{2}$–$2\frac{1}{2}$ lin. broad, obtuse or acute. Spikes terminal, with the flowers crowded at the apex, becoming lax and growing out usually 3–4 in. long in the fruiting stage, rather broad at the apex, scarcely tapering beyond the opened flowers; bracts ovate to lanceolate, acuminate, 1–$2\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, ciliate, more or less hairy on the back; bracteoles linear, 1–$1\frac{1}{2}$ lin. long. Calyx narrowly tubular, $2\frac{3}{4}$–$3\frac{3}{4}$ lin. long, $\frac{3}{4}$ lin. broad, 10-nerved, 5-toothed, sparingly to rather densely hispidly hairy; hairs adpressed and turned upwards or spreading; teeth narrowly lanceolate to linear-triangular, $\frac{2}{3}$–1 lin. long, spreading after flowering. Corolla deep blue, bright violet, rose or white; tube 3–5 lin. long, straight, cylindric, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad, adpressed-pilose outside, densely pilose at the throat inside; lobes obovate, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long, 1–2 lin. broad, unequal. Anthers $\frac{2}{3}$–$\frac{3}{4}$ lin. long, acuminate. Style 1–$1\frac{1}{2}$ lin. long, clavate. Capsule oblong, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long, $\frac{3}{4}$ lin. broad.—Hiern in Cat. Afr. Pl. Welw. i. 775; Engl. & Gilg in Baum, Kunene-Samb. Exped. 367. *B. rhodesiana,* S. Moore in Journ. Bot. 1900, 468.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 5833! Amboella; by the River Chitanda, below Goudkopje, *Baum*, 136! River Kubango, above Massaca, *Baum*, 267! 268! 269! River Longa, above the River Quiriri, *Baum*, 701!

Mozamb. Dist. British Central Africa: Rhodesia; Leshumo Valley, *Holub!* Salisbury, *Rand*, 154! Matabeleland, *Elliott!* Mashonaland; Charter Flats, *Hon. Mrs. Evelyn Cecil*, 83! high plateau, 3000–5000 ft., *Bryce!* (Tropical? South African Gold Fields, *Baines!*)

Baum, 701, has much larger bracts than the type.

48. **B. multicaulis,** *Engl. in Engl. Jahrb.* xviii. 69, *t.* 3, *fig. A.* A minutely very sparingly hispid many-stemmed herb; stems short (about 3–$3\frac{1}{3}$ in. long), erect or ascending; internodes 5–$7\frac{1}{2}$ lin. long. Leaves opposite, oblong-spathulate, only $3\frac{1}{2}$–$6\frac{1}{2}$ lin. long and $1\frac{1}{2}$–2 lin. broad, minutely sparingly hispid chiefly on the upper side, ciliolate, the uppermost sometimes very much approximated. Flowers rather few, in short interrupted terminal spikes: bracts (also the calyx and corolla-tube) densely or sparingly minutely hispid; hairs white, minute, somewhat

adpressed; bracteoles linear-lanceolate, 1½ lin. long, acuminate, ciliate. Calyx tubular, about 2½–4 lin. long, ¾ lin. broad, 10-ribbed; teeth lanceolate, very acute, ¾ lin. long. Corolla blue, funnel-shaped; tube 5 lin. long, ½ lin. broad; lobes spathulate, about 2–2½ lin. long and 1–1¼ lin. broad, the lower somewhat longer than the upper.—Durand & De Wild. in Comptes-rendus Soc. Bot. Belg. xxxiii. 103; DeWild. Études Fl. Katanga, 123.

Lower Guinea. Angola: Malange, *Teuscz*, 179.

South Central. Congo Free State: Kasai River, *Buchner*; Bashilange; Lulua River, *Pogge*, 322! Katanga; between Luapula and Lufila, *Descamps*; near Lukafu, *Verdick*, 12.

49. **B. hispida,** *Buch.-Ham. in D. Don, Prodr. Fl. Nep.* 91. An erect annual herb ½–1¾ ft. high, more or less densely covered with hispid hairs, scabrid; stem simple or branched in the upper part, terete; branches ascending. Lower leaves elliptic to oblong, up to 3½ in. long and 10 lin. broad, obtuse, coarsely or sometimes obscurely toothed, often scabrid with minute white points; upper leaves narrowly oblong-lanceolate or linear, usually 1–1½ (rarely up to 3) in. long, 1–4 lin. broad, usually acute, entire or sometimes sparingly toothed, much narrowed at the base. Flowers in loose interrupted terminal spikes usually under 6 in. long; bracts ovate to lanceolate or lanceolate at the base and subulate at the apex, 1–4 lin. long, acuminate, pilose or glabrous except on the ciliate margin, concave; bracteoles subulate to linear-lanceolate, ¾–1¾ lin. long. Calyx 1¾–4 lin. long, rather densely covered with spreading hispid hairs; teeth narrowly deltoid to linear-triangular, ⅓–1 lin. long, very acute. Corolla-tube 2¾–4¼ lin. long, straight, cylindric, glabrous outside or with a few minute hairs near the throat, rarely distinctly hairy; lobes oblong-obovate to obovate-cuneate, ¾–1¾ lin. long, ½–1 lin. broad. Anthers acuminate. Style ½–1⅔ lin. long. Capsule elliptic-oblong, 2½–3¼ lin. long.—Benth. in DC. Prodr. x. 496; A. Rich. Tent. Fl. Abyss. ii. 128; Vatke in Linnæa, xliii. 309; Engl. Hochgebirgsfl. Trop. Afr. 381, and Pfl. Ost-Afr. C. 360; Engl. & Gilg in Baum, Kunene-Samb. Exped. 366; Almagià in Ann. Istit. Bot. Roma, viii. 142; Hook. f. Fl. Brit. Ind. iv. 298; Wight, Ic. Pl. t. 1413. *B. schimperiana,* Hochst. ex Benth. in DC. Prodr. x. 496. *B. macrocarpa,* A. Rich. Tent. Fl. Abyss. ii. 128. *Striga schimperiana,* Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 128.

Upper Guinea. Senegambia, *Heudelot*, 132! Gambia, *Boteler!*

Nile Land. Eritrea: Mensa, *Terracciano & Pappi.* Abyssinia: Tigre; Adowa, *Steudner*, 789! Mount Sholoda, *Schimper*, 23! Addi-Dschoa (Additcha?), *Schimper*, 346! Mountains near Axum, *Schimper*, 1516! Shireh, *Quartin-Dillon & Petit*, 208! and without precise locality, *Schimper*, 774! British East Africa: near Mombasa, *Hildebrandt*, 2034! Uganda, *Scott-Elliot*, 6783 partly!

Lower Guinea. Angola: Amboella; between Mahutzua and Ediva, *Baum*, 970! German South-west Africa; Amboland; Upingtonia, *Schinz*, 13!

Mozamb. Dist. German East Africa: Usambara: Duga, *Holst*, 3183! Portuguese East Africa: Zambesi Delta; between Mambucha and Vicente, *Scott!*

Also in Madagascar and India.

B. browniana, Schinz in Verh. Bot. Ver. Brandenb. xxxi. 194, collected by Schinz at Auweb in S.E. Ondonga, appears from the description to be synonymous with the above.

50. **B. longifolia,** *Klotzsch in Peters, Reise Mossamb. Bot.* 225. An erect often robust annual herb up to 2½ ft. high; stem terete or subterete, usually much branched chiefly about the middle, more or less pubescent or pilose (often hispidly); branches alternate, erect-spreading, up to 1 ft. long. Leaves opposite below, alternate above, oblong or oblong-lanceolate to linear-lanceolate, up to 3½ in. long and ⅔ in. broad, obtuse to acuminate, narrowed at the base, sometimes shortly petiolate, entire or serrate, pubescent, often very scabrid. Spikes terminal, from a few inches to more than 1 ft. long when in fruit; flowers and fruit usually very much crowded above, distant below, usually alternate, shortly pedicellate; bracts ovate- or oblong-lanceolate to lanceolate, acute or acuminate or sometimes with a subulate apex, 1½–2 lin. long (the lower sometimes up to 1 in. long), rigid, concave, more or less pubescent, ciliate; bracteoles linear to lanceolate-triangular, 1–2 lin. long. Calyx 2–4 lin. long, 10-nerved, 5-toothed, pubescent with long or very short hairs, hispid and often scabrid, especially in fruit; teeth lanceolate-triangular to narrowly deltoid, acute or acuminate, ½–1 lin. long, the uppermost sometimes smaller than the rest. Corolla-tube 3½–4¼ lin. long, narrowly cylindric, slightly curved, glabrous or sparingly pilose; lobes oblong to obovate, ¾–1¾ lin. long, ⅔–1 lin. broad. Anthers acuminate. Style ¾–1⅔ lin. long. Capsule oblong, ovoid or oblong-ovoid, slightly curved and compressed, 2–3¼ lin. long, apiculate.

Upper Guinea. Senegambia, *Leprieur,* 8! Gambia, *Brown-Lester,* 62! *Ingram!*

Nile Land. Eritrea: Ginda, 3300 ft., *Schweinfurth & Riva,* 2121! Uganda: Masai River, 6000 ft., *Scott-Elliot,* 6783!

Mozamb. Dist. Portuguese East Africa: Rios de Sena, *Peters.* Makua Country; Namuli Hills, *Last!* Lower valley of the River Shire, *Meller!* British Central Africa: Nyasaland, *Buchanan,* 476! between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., *Whyte!* Manganja Hills, *Meller!* Mount Chiradzulu, *Whyte!*

We have not seen the type specimens of this species, but Klotzsch's description required only some slight modification to include all the specimens cited. The species is closely allied to *B. hispida,* and may be only a more robust form of it.

51. **B. prorepens,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 368. A prostrate herb loosely branched from the base, glabrous on the branches and leaves; branches very slender, terete, leafy, 12–16 in. long; internodes 3½–5 lin. long. Leaves opposite, sessile, oblong-lanceolate or sometimes elliptic, 4–5 lin. long, 2–2½ lin. broad, acute, cuneate at the base. Flowers solitary in the axils of nearly all the leaves, shortly pedunculate; peduncle about 1½ lin. long; bracts 2, linear, 2½–3 lin. long, ½–¾ lin. broad, acuminate. Calyx 3–3½ lin. long, rather densely covered at the base with long whitish hairs, glabrous above; teeth narrowly lanceolate, 1¼ lin. long, acuminate. Corolla azure-blue; tube

about 4½ lin. long, somewhat funnel-shaped, straight or slightly curved, glabrous outside, pilose at the throat inside; lobes obovate or obovate-orbicular, about 1½ lin. long and 1⅓ lin. broad. Anthers acute. Style 2 lin. long.

Lower Guinea. Angola: Amboella; between the Kulei and Kutsi Rivers, 4300 ft., *Baum*, 875!

Imperfectly known species.

52. **B. verbenoides,** *Klotzsch in Peters, Reise Mossamb. Bot.* 226. An erect hirsute-puberulous branched herb 2 ft. high; stem and branches terete, sparingly hirsute; branches short. Leaves oblong-lanceolate, the lower opposite, the upper alternate and narrower, 1½–2 in. long, 2–6 lin. broad, subcoriaceous, obtuse, shortly narrowed at the base, sparingly and stiffly pubescent above on the nerves beneath and on the margins; petiole short, with long hairs. Flowers in crowded capitate-spicate inflorescences 1–2 in. long on terminal or axillary alternate peduncles 2–3 in. long; bracts lanceolate-subulate, pubescent, shorter than the calyx. Calyx pubescent, scarcely ribbed, acutely 5-toothed. Corolla small, salver-shaped; tube narrow, sparingly pilose outside; lobes subequal, short, rounded, glabrous.

Mozamb. Dist. Portuguese East Africa: Mozambique, *Peters*.
Also in Madagascar.

53. **B. bragaana,** *Engl. Pfl. Ost-Afr. C.* 360. Stem branched from the base; branches erect, about 10–12 in. long, with all parts shortly and hispidly white-pilose. Leaves linear-lanceolate, rather thick. Inflorescence an interrupted few-flowered spike; bracts linear-lanceolate, scarcely equalling the calyx. Calyx elongate-tubular; teeth triangular, ¼ times shorter than the tube. Corolla-tube hispid-pilose, elongate, narrow, twice longer than the calyx; lobes broadly obovate, ⅓ times shorter than the tube, the lower lobe somewhat larger than the rest.

Mozamb. Dist. Portuguese East Africa: Beira; *Braga*, 11.

41. **STRIGA**, Lour.; Benth. et Hook. f. Gen. Pl. ii. 968.

Calyx tubular, 5–15- (rarely up to 17-) ribbed, 5- (rarely 4-) toothed or -lobed. Corolla-tube slender below, usually abruptly curved at or above the middle and more or less inflated from the curve to the apex; limb 2-lipped; upper lip inside, usually shorter than the lower, entire, emarginate, or 2-lobed; lower lip 3-lobed. Stamens 4, didynamous, included; anthers 1-celled, vertical, affixed at the back, connective sometimes mucronate at the apex. Style thickened or clavate above, stigmatose at the apex. Capsule oblong, ellipsoid or ovoid, loculicidal; valves coriaceous, entire. Seeds many, obovoid or oblong; testa reticulate.—Herbs erect and sometimes rigid, often parasitic and drying

black, usually scabrid. Leaves opposite below, alternate above, often linear and entire, rarely toothed, sometimes all reduced to scales. Flowers solitary in the axils of the upper leaves or bracts, usually forming a terminal spike, sessile, 2-bracteolate, small or rather large, often purple, red, orange-red or white.—*Campuleia*, Thouars, Gen. Nov. Madag. 7.

Species about 34, in the warmer parts of Africa, Asia and Australia.

* Calyx 5-ribbed.

† Corolla-tube curved about the middle.

Spikes rather loosely flowered; corolla almost glabrous outside.

Stems usually stout, with small broad scale-like leaves . . . . . 1. *S. orobanchoides.*

Stems slender, with distinct linear leaves.

Corolla 6 lin. long or more.

Calyx 3 lin. long; corolla-limb 7–8 lin. in diam. . . . . 2. *S. aspera.*

Calyx $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; corolla-limb $3\frac{1}{2}$–5 lin. in diam. . . . . 3. *S. brachycalyx.*

Corolla scarcely 3 lin. long . . . 4. *S. micrantha.*

Spikes usually very densely flowered; corolla very hairy outside.

‡ Leaves closely adpressed to the stem, usually less than 9 lin. long.

Leaves 2–5 lin. long, usually subulate, in distant pairs; spikes very slender; bracts not closely imbricate.

Lower lip of corolla $2\frac{1}{2}$–4 lin. long; lobes $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long . . . 10. *S. canescens.*

Lower lip of corolla $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; lobes about 1 lin. long . . . 11. *S. strictissima.*

Leaves 3–15 lin. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad, mostly in close pairs; spikes stouter; bracts often closely imbricate.

Plant blackish when dry; leaves and bracts more or less covered with scabrid points or sometimes nearly glabrous except on the stiffly ciliate margins . . . . . 5. *S. Thunbergii.*

Plant greenish when dry; leaves and bracts evenly and densely covered with rather soft greyish hairs . 6. *S. Welwitschii.*

‡‡ Leaves spreading, usually more than 9 lin. long.

Plant up to 16 in. high; stems distinctly quadrangular and narrowly winged; leaves up to 3 lin. long . . . 7. *S. Rowlandii.*

Plant up to 8 in. high; stems not distinctly quadrangular nor winged; leaves up to $1\frac{1}{4}$ in. long.

Corolla-tube only slightly inflated at the throat; calyx-teeth subulate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long . . . . 8. *S. Barteri.*

Corolla-tube much inflated at the throat; calyx-teeth narrowly deltoid, about 1 lin. long . . . 9. *S. glandulifera.*

†† Corolla-tube curved at the middle.

Corolla-limb 9–15 lin. in diam. . . . . 12. *S. hermonthica.*

Corolla-limb 4–6 lin. in diam . . . . . 13. *S. senegalensis.*

††† Corolla-tube almost straight . . . . 23. *S. Warneckei.*

** Calyx 10–17-ribbed.

† Spikes usually loosely flowered, often long and slender, or the flowers in the axils of the upper leaves.

‡ Calyx 10- (rarely 11–13) ribbed.

Plant hairy, with distinct leaves usually 6 lin. long or more.

Leaves usually linear and about 6–12 lin. long; flowers numerous, in dense or loose spikes; corolla-tube 4–7 lin. long.

Flowers mostly opposite in relatively stout often dense spikes; corolla-limb 6–9 lin. in diam. . . 14. *S. elegans.*

Flowers mostly alternate in very slender loose spikes; corolla-limb about 3 lin. in diam. . . . 15. *S. lutea.*

Leaves usually lanceolate, 1–2¼ lin. long, more or less toothed; flowers rather few in the axils of the upper distant pairs of leaves; corolla-tube 10–11 lin. long . . . . . 16. *S. Forbesii.*

Plant glabrous, with scale-like leaves 1½–2½ lin. long . . . . . 24. *S. Baumannii.*

‡‡ Calyx 15–17-ribbed.

Calyx rigid, very prominently and regularly ribbed; corolla white.

Corolla-tube 10 lin. long; limb 8–15 lin. in diam. . . . . 19. *S. pubiflora.*

Corolla-tube 6 lin. long; limb 5–6 lin. in diam. . . . . 20. *S. euphrasioides.*

Calyx scarcely rigid, less prominently and regularly ribbed; corolla orange or brick-red.

Corolla-tube 10–15 lin. long; limb 7–10 lin. in diam. . . . . 17. *S. latericea.*

Corolla-tube 8–9 lin. long; limb 11–12 lin. in diam. . . . . 18. *S. somaliensis.*

†† Spikes densely flowered (sometimes loosely flowered in *S. elegans*), rather short and thick.

Spikes cylindric; bracts lanceolate.

Leaves about 1 lin. broad; corolla-limb 6–9 lin. in diam. . . . . 14. *S. elegans.*

Leaves 2–3½ lin. broad; corolla-limb about 3 lin. in diam. . . . . 21. *S. Klingii.*

Spikes quadrangular; bracts broadly ovate to obovate . . . . . 22. *S. macrantha.*

1. **S. orobanchoides,** *Benth. in Hook. Comp. Bot. Mag.* i. 361, *t.* 19. A rigid erect parasitic herb 3–18 in. high, usually much branched from the base, more or less covered with short hairs or almost glabrous; root tuberous; branches usually stout, angular, erect. Leaves scale-like, opposite or alternate, lanceolate, up to about $\frac{1}{2}$ in. long, acute. Spikes terminal, often as long as the branches themselves, usually much interrupted, but sometimes rather densely-flowered and scarcely interrupted; flowers opposite to alternate, sessile; bracts lanceolate to broadly lanceolate, about $\frac{1}{4}$ in. long, $\frac{3}{4}$–1 lin. broad, acuminate, keeled, nearly glabrous or more or less pilose and ciliate; bracteoles linear, about 2 lin. long. Calyx $3\frac{1}{2}$–5 lin. long, somewhat scarious, shortly hairy or glabrous except the teeth, more or less irregularly 5-toothed, 5-nerved, splitting very easily between the teeth; teeth lanceolate, acuminate, about 1 lin. long, ciliate. Corolla brownish-red, rose, lavender to purple, or white; tube $4\frac{1}{2}$–6 lin. long, bent and inflated above the calyx, glabrous or minutely puberulous; limb 2-lipped; upper lip shortly 2-lobed; lower lip deeply 3-lobed; lobes ovate, $1\frac{1}{2}$–$2\frac{3}{4}$ lin. long, $1\frac{1}{4}$–$2\frac{1}{2}$ lin. broad, entire or slightly toothed at the apex, thin. Style about 2 lin. long, persistent, Capsule ovoid-oblong, $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, 1–$1\frac{1}{2}$ lin. broad.—DC. Prodr. x. 501; A. Rich. Tent. Fl. Abyss. ii. 129; Klotzsch in Peters, Reise Mossamb. Bot. 228; Schweinf. Beitr. Fl. Aethiop. 100; Engl. in Engl. Jahrb. x. 254; Hiern in Cat. Afr. Pl. Welw. i. 778, and in Dyer, Fl. Cap. iv. ii. 380; Almagià in Ann. Istit. Bot. Roma, viii. 143; Hook. f. Fl. Brit. Ind. iv. 299. *S. gesnerioides,* Vatke in Oest. Bot. Zeitschr. 1875, 11, and in Linnæa, xliii. 310; Engl. in Engl. Pfl. Ost-Afr. C. 361, and in Engl. Jahrb. xxx. 405; Engl. & Gilg in Baum, Kunene-Samb. Exped. 369; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 46. *Striga orchidea,* Hochst. ex Benth. in DC. Prodr. x. 501. *Buchnera gesnerioides,* Willd. Sp. Pl. iii. 338. *B. orobanchoides,* R. Br. in Salt, Abyss. Append. lxiv., name only.

Upper Guinea. Senegambia, *Heudelot,* 540! *Leprieur,* 6! Senegal, *Sieber,* 52! Togo: near Lome, *Warnecke,* 189! Southern Nigeria: River Quorra (Niger), *Vogel!*

Nile Land. Nubia: Hor Tamanib, near Suakin, *Lord!* Suakin, *Schweinfurth,* 176! Eritrea: Aïdereso, *Schweinfurth & Riva,* 1438! near Acrur, *Schweinfurth & Riva,* 1051! and various localities, *Terracciano & Pappi.* Abyssinia: Samen; near Enderder, *Schimper,* 1340! near Djenda-Dembea, *Steudner,* 782! Upper Sheikh, *Thomson!* Kordofan, *Pfund,* 232! *Kotschy,* 1 n! Mount Arashkol, *Kotschy,* 387! White Nile: Wod Schellai, *Schweinfurth,* 837! Somaliland: Golis Range, *Mrs. Lort Phillips!* Guldoo Hammel, *Miss Edith Cole!* British East Africa: Mombasa Island, *Hildebrandt,* 2035! between Mombasa and Lamu, *Whyte!* Mombasa to Takaunga, *Whyte!*

Lower Guinea. Lower Congo: Boma, *Monteiro!* Angola: road to Bembe, *Monteiro!* Loanda, *Welwitsch,* 5916! *Gossweiler,* 329! north of Loanda, *Gossweiler,* 1! Cazengo, *Gossweiler,* 647! Pungo Andongo, *Welwitsch,* 5848! Mossamedes, *Welwitsch,* 5824! by the River Longa, between the Rivers Lazingua and Quiriri, *Baum,* 665! German South-west Africa: Olukonda and Oshiheke, *Schinz,* 19! 35! lat. 23°, *Chapman & Baines!*

Mozamb. Dist. German East Africa: Amboni, *Holst,* 2683! Ugogo, *Hannington!* Usaramo; Bagamoyo, *Hildebrandt,* 1263! Portugnese East Africa: Tete, *Kirk!* British Central Africa: Niomkolo Island in Lake Tanganyika,

Carson! Nyasaland: Kondowe to Karonga, *Whyte!* near Karonga, *Scott!* Nyika Plateau, 6000–7000 ft., *Whyte!* Likoma Island, in Lake Nyasa, *Johnson*, 32! *Miss Kenyon!* and without precise locality, *Buchanan*, 1141! Rhodesia; Eastern Bamangwato Territory, *Holub!* Ngamiland; Kwebe, 3300 ft., *Lugard*, 127! *Mrs. Lugard*, 164

Also in the Cape Verde Islands, South Africa, Sokotra, Arabia, and India.

According to collectors' notes this species is parasitic on the roots of *Indigofera* and other *Leguminosæ*, *Ipomœa filicaulis*, *Euphorbia abyssinica*, *Sanseviera*, rushes, &c.

2. **S. aspera,** *Benth. in Hook. Comp. Bot. Mag.* i. 362. A rather slender erect sparingly and hispidly pubescent scabrid herb 6–15 in. high; stem usually freely branched from about the middle upwards. Leaves opposite or the upper alternate, linear, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, $\frac{1}{3}$–$1\frac{1}{2}$ lin. broad, hispidly pubescent and often scabrid with small white points, acute or subacute. Spikes terminal, slender, lax-flowered, up to 8 in. long; flowers alternate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. apart; bracts linear, 2–5 lin. long, acute, hispidly pubescent, scabrid; bracteoles similar to the bracts but smaller. Calyx about 3 lin. long, 5-nerved, 5-toothed, shortly and hispidly pubescent on the nerves and teeth; teeth narrowly triangular, acuminate, $\frac{3}{4}$–1 lin. long, the uppermost much smaller than the rest. Corolla purple or red, glabrous or puberulous; tube about 5 lin. long, very narrow below, curved and inflated above the middle; upper lip broadly obovate, about 2 lin. long, subtruncate or emarginate; lower lip $2\frac{1}{2}$–4 lin. long; lobes obovate or narrowly obovate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Capsule ellipsoid, 2–$2\frac{1}{2}$ lin. long, 1–$1\frac{1}{4}$ lin. broad, apiculate.—DC. Prodr. x. 501. *Buchnera aspera*, Schumach. & Thonn. Beskr. Guin. Pl. 280. *Euphrasia aspera*, Willd. Sp. Pl. iii. 197.

Upper Guinea. Senegambia, *Heudelot*, 165! Senegal, *Roger!* Gold Ceast: Ningo, *Thonning*. Northern Nigeria: Nupe; Jeba on the Niger, *Barter!*

Var. *filiformis*, Benth. in DC. Prodr. x. 501. Stems more slender, simple or very sparingly branched. Leaves more distant, narrowly linear. Calyx nearly $\frac{1}{3}$ in. long. Corolla-tube 6–$6\frac{1}{2}$ lin. long; upper lip about $3\frac{1}{2}$ lin. long; lower lip about $4\frac{1}{2}$ lin. long.

Upper Guinea. Southern Nigeria: River Niger, *Vogel*, 15!

Var. *Schweinfurthii*, Skan. Near var. *filiformis* in the corolla, but stems not so slender, leaves longer and broader, and calyx slightly longer, with narrower and longer teeth. Corolla rose-coloured.

Nile Land. British East Africa: Jur; Jur Ghattas, *Schweinfurth*, 1992!

S. Passargei, Engl. in Engl. Jahrb. xxiii. 515, t. 12, figs. M, N (Cameroons, *Passarge*, 48), of which we have seen no specimen, does not appear to differ from typical *S. aspera*.

3. **S. brachycalyx,** *Skan.* An erect somewhat rigid annual herb about $1\frac{1}{2}$ ft. high, thinly covered with fine rather short spreading hispid hairs, scabrid; stems simple below, very much branched from the middle to the apex; branches $1\frac{1}{2}$–6 in. long, slender, erect-spreading, leafy. Leaves opposite on the lower part of the stem, alternate above and on the branches, narrowly linear, 3–13 (usually 6–9) lin. long, $\frac{1}{3}$–$\frac{2}{3}$ lin. broad, obtuse, hispidly hairy, scabrid, especially along the somewhat

incurved margins, with white points. Spikes terminal, numerous, slender, 1½–3½ lin. long, more or less interrupted; flowers alternate; bracts ovate-lanceolate, ¾–1 lin. long, acute, concave, hispidly ciliate and with a few short hispid hairs on the keel; bracteoles linear, ½–⅔ lin. long, hispidly ciliate. Calyx 1½–1¾ lin. long, 5-nerved, 5-toothed, with white rather long stiff hairs chiefly on the margins of the teeth; teeth narrowly triangular, acuminate, ¾ lin. long, the uppermost smaller. Corolla sparingly and shortly glandular-pubescent, apparently white; tube 5 lin. long, very slender below, abruptly curved about 3¼ lin. from the base and inflated from the curve to the apex; upper lip broadly obovate or subrhomboid, 1–1¼ lin. long, 1½ lin. broad; lower lip 1½–1⅔ lin. long; lobes obovate-oblong, 1¼ lin. long, nearly ¾ lin. broad, obtuse. Style 2¾ lin. long. Capsule ovoid, 1¼ lin. long, ¾ lin. broad.

Upper Guinea. Northern Nigeria: Nupe; Jeba on the Niger, *Barter!*

4. **S. micrantha,** *A. Rich. Tent. Fl. Abyss.* ii. 130. Stem erect, paniculately branched, angular, tuberculate-scabrid. Leaves linear, tuberculate-scabrid on the upper-side and on the midrib and margins of the under-side. Spikes slender, forming a very much branched elongated panicle, with the flowers separated from one another; flowers very small, sessile; bracts linear. Calyx campanulate, 5-ribbed, pilose; teeth triangular-oblong, acute. Corolla tubular, curved, gradually inflated, scarcely ¼ in. long, 3 times as long as the calyx, 2-lipped; upper lip entire, scarcely shorter than the lower. Capsule ovoid, as long as the calyx, long-apiculate.

Nile Land. Abyssinia: Shirch, *Quartin-Dillon.*

5. **S. Thunbergii,** *Benth. in Hook. Comp. Bot. Mag.* i. 363. A rigid erect herb usually 6–9 in. high but sometimes up to 1½ ft. high, rather stout, more or less densely hispidly pubescent, scabrid; stems simple or sparingly branched. Leaves opposite, adpressed to the stems or branches, linear or linear-lanceolate, ¼–1¼ in. long, ½–1½ lin. broad, acute or somewhat obtuse, hispidly pubescent, often scabrid, especially along the margins, with white points. Spikes terminal, 1–7 in. long, usually densely-flowered and bearing imbricate bracts; flowers opposite; bracts ovate-lanceolate to lanceolate, 2¼–4 lin. long, acute or acuminate, shortly pubescent or sometimes glabrous except on the hispidly ciliate margins; bracteoles linear, about 2½ lin. long. Calyx 2–4 lin. long, 5-nerved, 5-toothed, pubescent on the nerves and teeth; teeth linear-triangular, ¾–1½ lin. long, acuminate. Corolla red, purple or violet, more or less glandular-pubescent; tube 4–5 lin. long, narrow below, curved and much inflated near the apex; upper lip broadly oblong or obovate, 2–2½ lin. long, entire or emarginate; lower lip 2½–3 lin. long; lobes oblong to oblong-linear, 1–2 lin. long. Capsule ellipsoid, 1½–1¾ lin. long, 1¼ lin. broad, apiculate.—DC. Prodr. x. 502; Hiern in Cat. Afr. Pl. Welw. i. 779, and in Dyer, Fl. Cap. iv. ii. 380; S. Moore in Journ. Bot. 1900, 468; Engl. & Gilg in Baum, Kunene-Samb. Exped. 369. *Buchnera asiatica*, Linn. Sp. Pl. ed. i, 630, partly. *B. bilabiata*, Thunb. Prodr. 100.

Lower Guinea. Angola: Pungo Andongo; near Condo, *Welwitsch*, 5854! Huilla; River Monino, *Welwitsch*, 5822! Kiver Kubango, near Kavanga, 3600 ft., *Baum*, 414.

Mozamb. Dist. British Central Africa: Rhodesia; Manika, *Hon. Mrs. Evelyn Cecil*, 159! Gwelo, *Gardner*, 54! Salisbury, *Rand*, 521. Matabeleland, *Elliott!* Ngamiland; Okavango Valley, 3000 ft., *Lugard*, 270!

Also in South Africa.

Baum, 552, named *S. Thunbergii*, var. *grandiflora*, Engl. in Baum, Kunene-Samb. Exped. 369, has somewhat larger flowers than the type. It has smaller flowers and shorter bracts and calyx than the variety *grandiflora*, Benth. in DC. Prodr. x. 502.

6. **S. Welwitschii,** *Engl. in Engl. Jahrb.* xxiii. 514, *t.* 12, *figs. F—G.* An erect herb 5–8 in. high, everywhere densely covered with soft grey pubescence, branched from the base; rootstock erect, bearing small scales; branches about ½ lin. thick, rather densely leafy. Leaves opposite, decussate, closely adpressed to the branches, linear-lanceolate, 5–6 lin. long, about ¾ lin. broad, entire, thickened and somewhat callose at the apex. Spikes slender, densely-flowered, up to 3 in. long; bracts like the leaves but somewhat shorter; bracteoles linear, 2 lin. long. Calyx 2¾–3 lin. long, 5-nerved, 5-toothed, scarious between the nerves, softly pubescent on the teeth and nerves; teeth narrowly triangular, 1¼ lin. long (except the uppermost, which is much smaller). Corolla pale lilac, whitish or white, glandular-pubescent outside; tube about 5 lin. long, narrow below, slightly curved and much inflated above; upper lip obovate, emarginate, 2–2½ lin. long, 1½ lin. broad; lobes of the lower lip linear, about 5 lin. long and ⅔ lin. broad.—Hiern in Cat. Afr. Pl. Welw. i. 779.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 5820! between Lake Ivantala and Quilengues, *Welwitsch*, 5821!

7. **S. Rowlandii**, *Engl. in Engl. Jahrb.* xxiii. 513, *t.* 12, *figs. A—D.* An erect herb 8–16 in. high or more, usually drying green, branched from the base, hispidly pubescent; stems and branches distinctly quadrangular, very narrowly winged at the angles, furrowed, leafy. Leaves opposite or subopposite, decussate, linear, up to 3 in. long, ¾–1¾ lin. broad, acute or subacute, scabrid. Spikes 4–8 in. long, slender; flowers usually in pairs 2–3 lin. apart; bracts lanceolate, 1½–2½ lin. long, acute; bracteoles like the bracts but smaller. Calyx 3½ lin. long, 5-toothed, 5-nerved, white-pubescent; teeth narrowly deltoid, about ⅔ lin. long. Corolla dull lilac or pink, rather densely covered outside with slender white hairs; tube 5–7 lin. long, much curved and inflated near the apex; upper lip obovate or oblong, emarginate, 1¼–1½ lin. long, about 1 lin. broad; lobes of the lower lip oblong, nearly 1 lin. long, scarcely ½ lin. broad. Capsule elliptic to obovoid, 1½ lin. long, 1–1¼ lin. broad.

Upper Guinea. Sierra Leone: Falaba, *Scott-Elliot*, 5207! Gold Coast: Afram Plains, *Johnson*, 709! Western Lagos, *Rowland!* Northern Nigeria: Nupe, *Barter*, 1169!

Parasitic on the roots of grasses.—*Barter.*

8. **S. Barteri,** *Engl. in Engl. Jahrb.* xxiii. 514, *t.* 12, *fig. E.* An erect parasitic densely and finely pubescent herb, 6–8 in. high, with a perpendicular scale-bearing rhizome; stem freely branched or sometimes simple, about ¾ lin. thick, slightly sulcate. Leaves opposite or alternate, linear to linear-lanceolate, 5–10 lin. long, ¾–1 lin. broad, entire, subacute, scabrid. Spikes up to 5½ in. long, those terminating the stems much longer than those terminating the branches; flowers usually in pairs about 2 lin. apart; bracts linear or sometimes lanceolate, ½ in. long below, about ¼–1 in. long above, finely pubescent, thick; bracteoles similar to the bracts but somewhat shorter. Calyx 4–4¼ lin. long, rather densely and finely pubescent, 5-nerved (the uppermost nerve much thinner than the others), 5-toothed, scarious between the nerves; teeth subulate, 1¼–1½ lin. long (except the uppermost which is much smaller and sometimes minute), thick, acute. Corolla lilac or white; tube about ½ in. long, rather densely glandular-pubescent above, much inflated and sharply curved about 1½ lin. from the apex; upper lip about 1 lin. long and ¾ lin. broad, emarginate; lobes of the lower lip porrect, linear-oblong, scarcely ¾ lin. long and ⅓ lin. broad. Style 2 lin. long. Capsule oblong, 2 lin. long, ¾ lin. broad, apiculate.

Upper Guinea. Northern Nigeria: Nupe, on stony hills, *Barter*, 1170!

Parasitic on the roots of grasses.—*Barter.*

9. **S. glandulifera,** *Engl. in Engl. Jahrb.* xxiii. 514, *t.* 12, *figs. H—J.* A much-branched erect herb, 6–8 in. high, everywhere shortly and finely pilose, very scabrid, leafy; stems and branches slender. Leaves opposite and subopposite, narrowly linear, up to 1¼ in. long and ¾ lin. broad, acuminate. Spikes terminal, up to 4 in. long, with the flowers usually in pairs 2–3 lin. apart; bracts lanceolate, 2½ lin. long, acuminate, densely pubescent; bracteoles similar to the bracts but shorter and narrower. Calyx 3¼ lin. long, 5-nerved, 5-toothed (the uppermost nerve very faint and the uppermost tooth minute), densely pubescent; teeth narrowly deltoid, about 1 lin. long, acute. Corolla deep rose; tube about ½ in. long, slightly curved and much inflated near the apex, densely glandular-pubescent above; upper lip 1½–2½ lin. long, 1¼–2 lin. broad, very slightly emarginate; lobes of the lower lip porrect, oblong, 1¼ lin. long, ¾ lin. broad. Style 3 lin. long. Capsule oblong, 1¾ lin. long, ¾ lin. thick.

Nile Land. Niamniam: Mbala Ngia Mountains, *Schweinfurth*, 2931!

10. **S. canescens,** *Engl. Pfl. Ost-Afr. C.* 361. An erect very rigid annual herb, 10–15 in. high, densely covered with short fine hispid closely adpressed hairs; stem simple or branched, quadrangular. Leaves small, in distant pairs, linear-subulate or lanceolate-subulate, 2–5 lin. long, acute or acuminate, closely adpressed. Spikes terminal, slender, up to 4 in. long; flowers mostly in pairs 1½–2½ lin. apart; bracts similar to the leaves, hispidly ciliate and covered with adpressed hairs; bracteoles subulate, 1½ lin. long. Calyx 2¾ lin. long, scarious, 5-nerved, 5-toothed (the upper nerve very faint and the upper tooth much smaller than the rest), adpressed-pilose chiefly on the nerves and

teeth; teeth subulate, $1\frac{1}{4}$ lin. long. Corolla except the base of the tube densely pilose or almost tomentose, white or pale lilac; tube $4\frac{1}{2}$–$5\frac{1}{2}$ lin. long, narrow at the base, curved and much inflated above; upper lip oblong, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 1–$1\frac{1}{2}$ lin. broad, truncate at the apex; lower lip $2\frac{1}{2}$–4 lin. long; lobes oblong or oblong-lanceolate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad, obtuse. Style $2\frac{1}{2}$ lin. long. Capsule obovoid, $1\frac{1}{4}$ lin. long, nearly 1 lin. broad.—Engl. in Engl. Jahrb. xxiii. 515, t. 12, figs. K, L (lobes of the lower lip of the corolla too narrow); Hiern in Cat. Afr. Pl. Welw. i. 779; S. Moore in Journ. Linn. Soc. xxxvii. 191. *S. Thunbergii*, A. Rich. Tent. Fl. Abyss. ii. 130, not of Benth.

Nile Land. Abyssinia: Shireh, *Petit!* Uganda: near Mulema and at Irunga, *Bagshawe*, 330! 394 C!

Lower Guinea. Angola: Huilla; by the River Monino, *Welwitsch*, 5823!

Mozamb. Dist. German East Africa: Kilimanjaro; Lake Jalla (Chala), *Volkens*, 300!

11. **S. strictissima,** *Skan*. Very similar to *S. canescens* in habit and foliage, but the stems are slightly stouter and more rigid, the corolla-tube is longer and narrower at the apex, the lower lip is much shorter and has shorter more acute lobes. Corolla dull pink, densely covered outside with short adpressed hairs; tube about $6\frac{1}{2}$ lin. long, narrow at the base, gradually curved and inflated at the apex; upper lip oblong, $1\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad, truncate and somewhat irregularly toothed at the apex; lower lip $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; lobes narrowly lanceolate, about 1 lin. long and $\frac{1}{3}$ lin. broad, subacute. Style $3\frac{1}{4}$ lin. long. Capsule oblong, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad.

Upper Guinea. Northern Nigeria: Nupe, on swampy plains, *Baxter*, 1263!

Schweinfurth, 1651, collected on the Wau in Jur, appears to be this. The Kew specimen has no perfect flowers.

12. **S. hermonthica,** *Benth. in Hook. Comp. Bot. Mag.* i. 365. An erect usually branched apparently parasitic herb up to 2 ft. high or more, but generally about 1 ft., hispidly hairy, scabrid, leafy; stems stout, quadrangular. Leaves opposite or alternate, linear-lanceolate or lanceolate, 1–3 in. long, 1–6 lin. broad, acute or acuminate, entire, hispidly hairy chiefly on the margins and nerves, very scabrid. Spikes terminal, more or less densely-flowered, often about 6 in. long; bracts lanceolate, $\frac{1}{3}$–$\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, acuminate, hispidly ciliate, scabrid; bracteoles subulate, 2–$2\frac{3}{4}$ lin. long, hispidly ciliate; flowers large and showy. Calyx $4\frac{1}{2}$–5 lin. long, scarious, 5-toothed, 5-nerved, hispidly hairy on the teeth and nerves, sometimes scabrid; teeth narrowly triangular, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long (the uppermost much smaller), with filiform tips. Corolla rose-red or red; tube 7–10 lin. long, sparingly and minutely pubescent, curved and inflated above the calyx; upper lip suborbicular, about $\frac{1}{3}$ in. in diam., emarginate or shortly 2-lobed; lower lip 3-lobed; lobes oblong or oblong-obovate, 5–7 lin. long, $1\frac{1}{4}$–$1\frac{1}{3}$ in. broad, very thin, veined. Style $2\frac{1}{2}$ lin. long, persistent. Capsule ellipsoid or oblong, 2–3 lin. long, $1\frac{1}{4}$–2 lin. broad.—DC. Prodr. x. 502; A. Rich. Tent. Fl. Abyss. ii. 131; Schweinf. Beitr. Fl. Aethiop.

100; Engl. Hochgebirgsfl. Trop. Afr. 381; Engl. Pfl. Ost-Afr. C. 361; Oliver in Trans. Linn. Soc. xxix. 122; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 46; Almagià in Ann. Istit. Bot. Roma, viii. 143. *Buchnera hermonthica*, Delile, Fl. Egypte, 245, t. 34, fig. 3.

Nile Land. Æthiopia, *Kotschy*, 195! 268! Kordofan: El Greo, *Pfund*, 465! 679! Nubia: Berber; El Mekerif, *Schweinfurth*, 594! Khartoum, *Petherick!* Gallabat: near Matamma, *Schweinfurth*, 181! Eritrea: *Steudner*, 778! Bogos, *Terracciano & Pappi*, 2642! Blue Nile, *Muriel*, 34! Rosieres, *Muriel*, 22; White Nile, *Petherick!* Abyssinia: near Gapdia, *Schimper*, 790! and without precise locality, *Schimper*, 496! 1501! Sennar, *Kotschy*, 561! Jur: Jur. Ghattas, *Schweinfurth*, 2381! Moru: Neangara, *Petherick!* Uganda: Unyoro, *Speke & Grant*, 572! 12th march from Mumias, *Whyte!* Bugangadzi, 4000 ft. *Dawe*, 120! Elgon District, *James!* West Ankole, 4000 ft. *Dawe*, 444!

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 42!

South Central. Congo Free State: by the Lomami River, *Descamps*.

Also in Egypt and Arabia.

Parasitic on the roots of *Sorghum*, *Zea*, &c.

13. **S. senegalensis,** *Benth. in DC. Prodr.* x. 502. Very closely resembles *S. hermonthica*, and is probably only a small-flowered form of it; in habit and foliage it is the same. Calyx 3½–4 lin. long, 5-toothed, 5-nerved; teeth triangular, about 1 lin. long, with filiform tips, ciliate. Corolla purple or red; tube 6–7 lin. long, curved and inflated above the calyx; upper lip obovate, slightly emarginate or 2-lobed, 1½–3 lin. long and broad; lower lip 3-lobed; lobes obovate or obovate-oblong, 2–4 lin. long, 1½–3 lin. broad. Style 1¾ lin. long. Capsule obovoid-oblong, about 2 lin. long and 1½ lin. broad.—Schweinf. Beitr. Fl. Aethiop. 101.

Upper Guinea. Senegambia, *Heudelot! Roussillon!* Gambia, *Ingram!* Southern Nigeria: by the River Niger, *Baikie!* Aboh, *Barter*, 136! Stirling Hill, *Vogel*, 130! Northern Nigeria: Nupe, *Barter*, 866! Confluence of the Niger and Benue Rivers, *Ansell!* Bornu; Maigumeri, *Elliott*, 128!

Nile Land. Abyssinia: Horcones Valley, *Wellby!* White Nile: Dinka District, *Harnier*.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Schinz*, 14 partly!

Mozamb. Dist. Mozambique, *Forbes!*

14. **S. elegans,** *Benth. in Hook. Comp. Bot. Mag.* i. 363. An erect rather rigid annual herb, 6–18 in. high, drying green; stems usually simple, densely pubescent. Leaves opposite, erect, linear-lanceolate, ½–1 in. long, usually about 1 lin. broad, subacute, rather thick, densely and scabridly pubescent, entire. Spikes terminal, 2–8 in. long, more or less interrupted or densely flowered; bracts lanceolate, ¼–½ in. long, acuminate, densely and shortly pubescent; bracteoles subulate or linear, 2½–3¼ lin. long. Calyx about 5 lin. long, 10- or 11-nerved, 5-toothed, rather densely pubescent, scabrid; teeth narrowly triangular or subulate, somewhat rigid, 1¼–2 lin. long. Corolla scarlet,

crimson, pink or white; tube 6–7 lin. long, thickly covered with short gland-tipped hairs, curved and slightly inflated at the apex; upper lip obreniform, 2–2½ lin. long, about 5 lin. broad; lower lip 3-lobed; lobes oblong to obovate, 4½–5 lin. long, 1¼–2¾ lin. broad. Style 4½–5½ lin. long. Capsule oblong, about 2 lin. long and 1 lin. broad.—DC. Prodr. x. 502; Engl. Hochgebirgsfl. Trop. Afr. 382; Engl. Pfl. Ost-Afr. C. 361; Hiern in Cat. Afr. Pl. Welw. i. 779, and in Dyer, Fl. Cap. iv. ii. 382; Engl. & Gilg in Baum, Kunene-Samb. Exped. 369; Engl. in Engl. Jahrb. xxviii. 480; S. Moore in Journ. Linn. Soc. xxxvii. 190. *Buchnera elegans*, D. Dietr. Syn. Pl. iii. 525.

Lower Guinea. Angola: Pungo Andongo; near Sobato Nbilla, *Welwitsch*, 5851! by the River Habungu, at 3600 ft., *Baum*, 490!

Mozamb. Dist. German East Africa: below Ruchigga. 5000 ft., *Bagshawe*, 495. Kilimanjaro; below Marangu, *Volkens*, 2137! Uhehe; Uchungwe Mountains, near Kissinga, *Goetze*, 582. British Central Africa: near Lake Tanganyika, *Cameron!* Nyasaland; near Blantyre, *Last!* between Lakes Shirwa and Chiuta, *Cunningham*, 18! Rhodesia; Leshumo Valley, *Holub*, 483! 484! Mashonaland, *Hon. Mrs. Evelyn Cecil*, 259!

Also in South Africa.

15. **S. lutea,** *Lour. Fl. Cochinch.* 22. An erect slender parasitic herb, often 6–9 in. high (rarely under 3 or more than 12 in.), usually branched, scabridly hairy or sometimes villous, drying green or brown. Leaves alternate or opposite, narrowly linear or sometimes lanceolate, ¼–1½ in. (often about ½ in.) long, ½–2 lin. broad, acute or obtuse, entire, scabridly hairy. Spikes terminal, usually 4–6 in. long, distant-flowered; bracts linear, 1½–4 lin. long, obtuse or acute, scabridly hairy; bracteoles similar but shorter. Calyx 2½–4 lin. (usually 3 lin.) long, generally 10-ribbed, 5-toothed, scarious between the ribs, scabridly hairy on the ribs and teeth; teeth stiff, subulate or narrowly triangular, ⅓–1½ lin. long, the uppermost usually smallest. Corolla scarlet, red, yellow or white; tube 4–7 lin. long, very slender, glabrous or puberulous, straight and cylindric to about 1 lin. below the apex where it is distinctly curved and inflated; upper lip broadly obovate or almost obreniform, about 1 lin. long and 2 lin. broad; lower lip 3-lobed; lobes obovate or cuneate-obovate, 2–2½ lin. long, 1½–1¾ lin. broad. Style 3½ lin. long. Capsule oblong-ovoid or ellipsoid, 1¾–2 lin. long, 1–1¼ lin. broad.—Benth. in Hook. Comp. Bot. Mag. i. 363; Vatke in Oest. Bot. Zeitschr. 1875, 11; Durand & Schinz, Études Fl. Congo, i. 212; Hiern in Cat. Afr. Pl. Welw. i. 780, and in Dyer, Fl. Cap. iv. ii. 382; Hook. f. Fl. Brit. Ind. iv. 299. *S. hirsuta*, Benth. in DC. Prodr. x. 502; Schweinf. Beitr. Fl. Aethiop. 100; Engl. Pfl. Ost-Afr. C. 361; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 46, and Reliq. Dewevr. 171; Engl. & Gilg in Baum, Kunene-Samb. Exped. 369; Klotzsch in Peters, Reise Mossamb. Bot. 226; Almagià in Ann. Istit. Bot. Roma, viii. 142. *S. hirsuta*, var. *humilis*, Klotzsch, l.c. 227, 571. *S. hirsuta*, var. *perpusilla*, A. Rich. Tent. Fl. Abyss. ii. 132. *S. pusilla*, Hochst. ex Benth. in DC. Prodr. x. 503. *S. zangebarica*, Klotzsch, l.c. 571, t. 35. *S. coccinea*, Benth. in Hook. Comp. Bot. Mag. i. 364, and in DC. Prodr. x. 503. *S. lutea*, var. *coccinea*, O. Kuntze, Rev. Gen. Pl. iii. ii. 240. *Campuleia coccinea*,

Hook. Exot. Fl. iii. t. 203. *C. hirsuta*, A. Rich. Tent. Fl. Abyss. ii. 132. *Buchnera asiatica*, Linn. Sp. Pl. 630, partly. *B. coccinea*, Benth. in Wall. Cat. 3870, and Scroph. Ind. 40, not of Scopoli.

Upper Guinea. Sierra Leone, *Morson !* Northern Nigeria: Nupe, *Barter*, 538 !

Nile Land. Eritrea: Assaorta, *Pappi*, 3344; Amasen, *Ragazzi*, 261. Gallabat: near Matamma, *Schweinfurth*, 178 ! Abyssinia: Gafta, *Schimper*, 1209! Bongo: Gir, *Schweinfurth*, 2159! Addai, *Schweinfurth*, 2180! River Lesi, *Schweinfurth*, 4026! Jur: Jur Ghattas, *Schweinfurth*, 1982! 2285! Uganda: Kavirondo; between Nandi and Mumias, *Whyte !* Elgon District, *James !* Entebbe, *Brown*, 21 ! British East Africa: Athi Plains, 5600 ft., *Scott-Elliot*, 6545! Nyika Country, *Wakefield !*

Lower Guinea. Loango: near Putumongo, *Soyaux*, 189! Angola: Pungo Andongo; by the River Cuanza, *Welwitsch*, 5881! between Luxillo and Cazella, *Welwitsch*, 5880! Huilla; between Lopollo and Jau, *Welwitsch*, 5819! by the River Kubango, *Baum*, 393! Lower Congo; Boma, *Monteiro !* Stanley Pool, *Callewaert !* German South-west Africa: Amboland; Olukonda, *Schinz*, 16 !

Mozamb. Dist. Zanzibar, *Kirk ! Frere ! Hildebrandt*, 1134! German East Africa: Zanguebar, *Kirk*, 67! Rovuma River, *Kirk !* Karagwe, *Scott-Elliot*, 8179! Usambara; Amboni, *Holst*, 2689! Kilimanjaro; Marangu, *Volkens*, 225! Portuguese East Africa: Mozambique, *Hutton ! Kirk !* Namiqua Island, *Hutton !* Lower Zambesi; Shupanga, *Kirk !* Morambala Mountain, *Scott !* east coast of Lake Nyasa, *Johnson*, 101! British Central Africa: Nyasaland: Nyika Plateau, 8000 ft., *McClounie*, 60! Shire Highlands, *Buchanan*, 369! Namasi, *Cameron !* Rhodesia; Gwelo, *Gardner*, 42! Matabeleland, *Hon. Mrs. Evelyn Cecil*, 128 !

Also in South Africa, the Mascarene Islands, and the hotter parts of Asia.

S. lutea, var. *bicolor*, O. Kuntze, Rev. Gen. Pl. iii. ii. 240, is the form in which the corolla is scarlet above and yellow below.

16. **S. Forbesii,** *Benth. in Hook. Comp. Bot. Mag.* i. 364. An erect herb up to 15 in. high, usually drying green; stem simple or sparingly branched, scabridly pubescent, often rather stout, leafy. Leaves opposite or subopposite, lanceolate-linear or lanceolate, 1–2¼ in. long, 1½–7 (usually 2½) lin. broad, somewhat obtuse, shortly pubescent, very scabrid, more or less toothed, often callose at the apex of the leaf and teeth. Flowers solitary in the axils of the upper leaves; bracteoles linear, about 5 lin. long, hispidly hairy, callose at the apex. Calyx 5–6 lin. long, 10–13-ribbed, deeply 5-lobed, scabridly hairy; lobes linear-lanceolate, 2½–4¼ lin. long, unequal, scarcely acute, callose at the apex. Corolla pink, scarlet or bright yellow; tube 10–11 lin. long, sharply curved and inflated at the apex, shortly pubescent; upper lip 1¾–3 lin. long, 2½–4 lin. broad, subtruncate or shortly 2-lobed; lobes divergent, subacute or rounded; lower lip 3-lobed; lobes oblong to broadly obovate, usually 3–5 lin. long and 2½–5 lin. broad. Style 7–8 lin. long. Capsule oblong or ellipsoid, 3–4 lin. long, about 2 lin. broad.—DC. Prodr. x. 503; Klotzsch in Peters, Reise Mossamb. Bot. 227; Engl. Pfl. Ost-Afr. C. 361, excl. syn.; Hiern in Cat. Afr. Pl. Welw. i. 780, and in Dyer, Fl. Cap. iv. ii. 384. *Buchnera Forbesii*, D. Dietr. Syn. Pl. iii. 526. *Cycnium pratense*, Engl. Pfl. Ost-Afr. C. 361.

Upper Guinea. Senegambia, *Leprieur*, 5 *!*

Nile Land. Gallabat: near Matamma, *Schweinfurth*, 179! Uganda: Elgon

District, *James!* Nandi; Sibu, *James!* and without precise locality, *Wilson*, 26! 27!

Lower Guinea. Angola: Pungo Andongo; by the Cuanza River, *Johnston!* Lombe, *Welwitsch*, 5893!

Mozamb. Dist. Pemba Island, *Lyne!* German East Africa; Usambara; Lutindi, 4900 ft., *Holst*, 3269! Portuguese East Africa: Mozambique, *Forbes!* Rios de Sena, *Peters;* foot of Morambala Mountain, *Kirk!* near Mazaro, *Kirk!* British Central Africa: Nyasaland; North Nyasa and Upper Loangwa River, *Nicholson!* River Shire, Elephant Marsh and Nsese River, *Scott!* north of the River Shire, *Meller!* Bechuanaland: Bakwena Territory, 3500 ft., *Holub!*

Also in South Africa and Madagascar.

S. Dewevrei, De Wild. & Durand in Comptes-rendus Soc. Bot. Belg. xxxviii. 99, from the Congo Free State, I have not seen. Judging from the description it is the same as, or very closely allied to, the above species.

17. **S. latericea,** *Vatke in Linnæa*, xliii. 311. Stems erect, rather slender, 1–2½ ft. high, simple, sparingly leafy, somewhat densely covered with very small fine scarcely hispid hairs; internodes usually 2–3½ in. long. Leaves mostly opposite, lanceolate or linear-lanceolate, 1–1¾ in. long, 1½–2½ lin. broad, acuminate, 3-nerved, densely and shortly pubescent, scabrid, with a few rather long and slender teeth on each side usually about the middle. Flowers in a terminal loose spike up to 6 in. long, and sometimes also in the axils of the uppermost leaves distant from the rest; bracts lanceolate, 3–5½ lin. long, or the lowermost sometimes up to 1 in. long, acuminate, rather densely and shortly pubescent, ciliate; bracteoles linear, 2–3 lin. long, densely pubescent. Calyx 6–7 lin. long, 15–17-ribbed, densely covered with fine short scarcely hispid hairs; teeth triangular-ligulate, 2–4 lin. long, somewhat unequal, acuminate, more or less distinctly 3-ribbed. Corolla brick-red; tube 10-15 lin. long, sharply curved and inflated about 2½ lin. from the apex, glandular-hairy except at the glabrous base; limb 2-lipped, 7–10 lin. in diam.; upper lip broadly obovate to transversely oblong, 3–4 lin. long, 4½–6 lin. broad, subtruncate or emarginate; lower lip deeply 3-lobed; lobes broadly obovate to obovate-oblong, 4¾–5½ lin. long, 3–4½ lin. broad, rounded, the median rather larger than the others. Anthers oblong, ⅔ lin. long, obtuse. Style nearly as long as the corolla-tube, clavate at the apex. Capsule oblong, about 4 lin. long, 1¾ lin. broad, somewhat compressed, beaked.—*Cycnium strictum*, Engl. Pfl. Ost-Afr. C. 361.

Nile Land. British East Africa: near Magi Chumoi, 570 ft., *Kässner*, 474! Sultan Hamoud, *Kässner*, 645! Wanga, *Smith!* Ukamba; Kitui, *Hildebrandt*, 2752.

Mozamb. Dist. German East Africa: Usambara; Duga; *Holst*, 3201. Masheua, *Holst*, 8838; Hosiga, *Holst*, 2532!

18. **S. somaliensis,** *Skan.* Stems erect, 6–12 in. high, simple, about 1 lin. in diam., covered with short fine hairs, few-leaved, bearing near the base several pairs of rudimentary leaves or scales; upper internodes 1¼ in. long. Leaves in 2 or 3 pairs, linear-lanceolate, 1½–1¾ in. long, 1½–2 lin. broad, acuminate, quite entire or very few-toothed, densely and shortly pubescent, somewhat scabrid. Flowers opposite or

subopposite in loose terminal spikes 4–7 in. long, the lower sometimes widely separated from the rest; bracts lanceolate or linear-lanceolate, 2–7 lin. long or the lowest up to 1 in. long, acute or acuminate, densely and shortly pubescent, more or less scabrid; bracteoles linear, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long, densely pubescent. Calyx $\frac{1}{3}$–$1\frac{1}{2}$ in. long, densely and hispidly pubescent outside and inside, the hairs inside longer and somewhat adpressed, 15- or 16-ribbed; teeth triangular-lanceolate, $1\frac{1}{2}$–$3\frac{3}{4}$ lin. long, acuminate, somewhat unequal. Corolla orange-red; tube $\frac{2}{3}$–$\frac{3}{4}$ in. long, sharply curved and slightly inflated near the apex, thinly covered except at the glabrous base with rather long gland-tipped hairs; limb 11–12 lin. in diam., 2-lipped; upper lip broadly obovate, 4–5 lin. long, 6–7 lin. broad, deeply emarginate; lobes rounded; lower lip deeply 3-lobed; lobes oblong or obovate-oblong, 6–7 lin. long, $3\frac{1}{2}$–4 lin. broad, slightly apiculate. Anthers narrowly oblong, $\frac{3}{4}$ lin. long, obtuse. Style about $5\frac{1}{2}$ lin. long, dilated at the apex.

Nile Land. Somaliland: Ononuf, *James & Thrupp!*

19. **S. pubiflora,** *Klotzsch in Peters, Reise Mossamb. Bot.* 227. A slender erect herb, 1 ft. high; stem simple or branched above, slender, quadrangular, glabrous below, somewhat scabrid towards the apex. Leaves opposite below, alternate above, linear, 10–15 lin. long, 1 lin. broad, subacute, attenuated at the base, quite entire, revolute on the margin, white-subtuberculate-scabrid. Flowers 4–9, alternate, in loose spikes terminating the stem and branches, shortly pedicellate; bracts and bracteoles subulate, scabrid, 2–5 lin. long. Calyx tubular, 15-ribbed, scabrid, 5-toothed, $5\frac{1}{2}$ lin. long; teeth lanceolate-subulate, $1\frac{1}{2}$ lin. long, scabrid inside and outside. Corolla salver-shaped, 2-lipped; tube 10 lin. long, narrow, villous, geniculate-incurved and somewhat inflated above the middle; upper lip broadly truncate-obovate, $\frac{1}{2}$ as long as the lower; lower lip 3-lobed; lobes obovate, $\frac{1}{3}$ in. long, 2 lin. broad, finely pubescent on the margins and outside. Capsule $\frac{1}{4}$ in. long, 2 lin. broad, compressed, acute; valves recurved at the apex after dehiscence.—Engl. Pfl. Ost-Afr. C. 361.

Mozamb. Dist. Portuguese East Africa: Mozambique, *Peters.*

Var. *sansibarensis*, Engl. Pfl. Ost-Afr. C. 361. Stem up to 18 in. high, scabridly pubescent everywhere, but more densely towards the apex. Calyx $\frac{2}{3}$–$\frac{3}{4}$ in. long; teeth up to $\frac{1}{4}$ in. long. Corolla white; tube 1–$1\frac{1}{4}$ in. long, straight below, curved and inflated from 2–3 lin. below the apex; upper lip $\frac{1}{3}$ in. long and $\frac{1}{2}$ in. broad; lobes of lower lip $\frac{1}{2}$–$\frac{2}{3}$ in. long, 5–$5\frac{1}{2}$ lin. broad. Capsule ovoid, about $\frac{1}{3}$ lin. long and $2\frac{1}{4}$ lin. broad.—*Striga zanzibarensis*, Vatke in Linnæa, xliii. 310.

Nile Land. British East Africa: coast near Lamu Island, *Hildebrandt*, 1907! Wateruma (Duruma), *Kässner*, 134!

Mozamb. Dist. German East Africa: Mafia Island, *Kirk!* Usambara; Tanga, *Heinsen*, 87! Muoa, *Holst*, 2989! Usagara, *Kirk!* Portuguese East Africa: in swamps at Dondo, near Beira, *Hon. Mrs. Evelyn Cecil*, 247! British Central Africa: Nyasaland, *Buchanan*, 1174!

20. **S. euphrasioides,** *Benth. in Hook. Comp. Bot. Mag.* i. 364. An erect annual herb, 6–18 in. high, almost glabrous or more or less

covered with short stiff hairs, usually very scabrid; stem simple or freely branched; branches erect-spreading. Leaves mostly alternate, linear to linear-lanceolate, $\frac{1}{2}$–2 in. long, $\frac{3}{4}$–2 lin. broad, rather acute, entire or few-toothed. Flowers axillary, solitary, alternate, forming long lax terminal spikes; lower bracts leaf-like, the upper linear to subulate, 2–4 lin. long, shortly and finely pubescent; bracteoles linear, $1\frac{1}{4}$–2 lin. long, otherwise as the bracts. Calyx tubular, 5–$5\frac{1}{2}$ lin. long, prominently 15-ribbed, 5-toothed, hispidly pubescent; teeth lanceolate, slightly unequal, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, elongating in the fruiting stage, acute. Corolla rather densely white-pilose on the upper part of the tube and on the outside of the limb; tube about $\frac{1}{2}$ in. long, abruptly curved about $\frac{1}{3}$ in. from the base and inflated at the curve; upper lip broadly obovate, emarginate or truncate, $1\frac{1}{2}$–2 lin. long, 2–$2\frac{1}{2}$ lin. broad; lobes of the lower lip narrowly obovate to obovate-oblong, $2\frac{1}{2}$–3 lin. long, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. broad, obtuse. Capsule ovoid, $\frac{1}{4}$ in. long, $1\frac{3}{4}$ lin. broad, apiculate; valves recurved at the apex after dehiscence.—DC. Prodr. x. 503; Hook. f. Fl. Brit. Ind. iv. 299. *Buchnera euphrasioides*, Vahl, Symb. iii. 81; Wight, Ic. Pl. t. 855.

Mozamb. Dist. British Central Africa: Nyasaland; Fort Hill, Tanganyika Plateau, 3500–4000 ft, *Whyte!* Nyika Plateau, 6500 ft., *McClounie*, 178!

Also in India, Ceylon and Java.

21. **S. Klingii,** *Skan.* An erect annual herb about 1 ft. high, drying green or brown, densely covered with fine but very stiff grey hairs which are much thickened at the base; stem simple or shortly branched near the apex, quadrangular, about $1\frac{1}{4}$ lin. thick, somewhat leafy. Leaves opposite, linear-oblong to lanceolate, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, 2–$3\frac{1}{2}$ lin. broad, obtuse, slightly narrowed at the base, entire or with a few obscure teeth, thick, callose at the apex, extremely scabrid. Spikes terminal, cylindric, 3–4 in. long, $\frac{1}{3}$ in. broad, densely-flowered, often with 1 or more short spikes just below the terminal one; bracts imbricate, broadly lanceolate, about $\frac{1}{3}$ in. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, acuminate, with long stiff hairs on the margin and short ones on both surfaces; bracteoles linear, 2–3 lin. long, stiffly hairy. Calyx about $3\frac{1}{2}$ lin. long, 10-ribbed (4 of the ribs very prominent), 5-toothed, stiffly hairy; teeth narrowly triangular to linear, acuminate, unequal, 1–$1\frac{1}{2}$ lin. long. Corolla red, rather densely pubescent outside; tube 5 lin. long, curved and slightly inflated from the middle to the apex; upper lip somewhat quadrate, emarginate, scarcely 1 lin. long and broad; lower lip 3-lobed; lobes elliptic-oblong, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. long, $\frac{3}{4}$–1 lin. broad. Style $2\frac{3}{4}$ lin. long, clavate and emarginate at the apex. Capsule oblong, 2–$2\frac{1}{2}$ lin. long and nearly 1 lin. broad, apiculate.—*Buchnera Klingii*, Engl. in Engl. Jahrb. xviii. 72, t. 3, figs. R—S.

Upper Guinea. Togo: Assumafaru, *Buettner*, 293. Ketschem Timoy, *Buettner*, 221! Northern Nigeria: Borgu, in swamps, *Barter*, 758!

22. **S. macrantha,** *Benth. in DC. Prodr.* x. 503. A somewhat stout erect herb 2–4 ft. high; stem usually branched above, quadrangular, bisulcate, scabridly hairy. Leaves opposite, linear-lanceolate to lanceo-

late, up $3\frac{1}{2}$ in. long and $\frac{1}{2}$ in. broad, scarcely acute, obtusely serrate, 3-nerved, shortly pubescent, very scabrid. Spikes terminal, quadrangular, densely-flowered, $1\frac{1}{2}$–5 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. broad, densely covered with slender glandular hairs; bracts broadly ovate to obovate, $2\frac{1}{2}$–$4\frac{1}{4}$ lin. long, $1\frac{3}{4}$–$2\frac{1}{2}$ lin. broad, obtuse or acute; bracteoles lanceolate, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Calyx $\frac{1}{4}$–$\frac{1}{2}$ in. long, 10- or 11-nerved, 5-toothed, densely glandular-pubescent; teeth triangular, 1–$1\frac{3}{4}$ lin. long, thick. Corolla white, pilose outside; tube $8\frac{1}{2}$–10 lin. long, slender, sharply curved near the apex; upper lip very broadly obovate, $1\frac{1}{2}$–2 lin. long, $3\frac{1}{2}$ lin. broad, subtruncate or somewhat emarginate; lower lip 3-lobed; lobes obovate-oblong, $2\frac{1}{2}$–$3\frac{1}{4}$ lin. long, 2–$2\frac{1}{4}$ lin. broad. Style about $\frac{1}{2}$ in. long. Capsule ellipsoid-ovoid, $3\frac{1}{2}$ lin. long, 2 lin. broad.—Hiern in Cat. Afr. Pl. Welw. i. 780. *Buchnera macrantha*, Benth. in Hook. Comp. Bot. Mag. i. 366. *B. Buettneri*, Engl. in Engl. Jahrb. xviii. 72, t. 3, figs. T—U., and in Schlechter, Westafr. Kautschuk-Exped. 314.

Upper Guinea. Senegambia, *Heudelot*, 607! Gambia, *Brown-Lester*, 34! Sierra Leone: about Sierra Leone, *Scott-Elliot*, 4174! *Winwood Reade!* Bumban to Port Lokko, *Scott-Elliot*, 5677! Scarcies, *Scott-Elliot*, 4455! Togo: Bismarckburg, *Kling*, 179, 180, 183, and without precise locality, *Buettner*, 350. Lagos, *Millen! Millson*, 39! *Rowland!* Northern Nigeria: Nupe, *Barter*, 985!

Lower Guinea. Angola: Golungo Alto; mountains of Alto Queta, *Welwitsch*, 5907! Quibola, *Monteiro!*

23. **S. Warneckei,** *Engl. MSS.* An erect rather slender herb 12–18 in. high, thinly covered with fine somewhat short spreading hairs, scabrid; stems simple, leafy, with short internodes. Leaves opposite, narrowly linear, up to $1\frac{1}{2}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad, obtuse, somewhat incurved along the margins. Spikes terminal, interrupted, very slender, 2 in. long or more; flowers alternate; bracts linear, leaf-like below, gradually becoming shorter upwards, hispidly hairy; bracteoles linear, $\frac{3}{4}$ lin. long, hispidly hairy. Calyx $2\frac{1}{4}$–$2\frac{1}{2}$ lin. long, scarious, 5-nerved, irregularly slit into 5 linear-triangular acuminate teeth, rather long and hispidly hairy on the upper part and on the teeth. Corolla-tube about $2\frac{1}{2}$ lin. long, somewhat constricted in the middle, inflated above, but scarcely curved, thinly 10-nerved, very minutely pubescent and sprinkled over with minute capitate blackish glands; upper lip $\frac{1}{2}$ lin. long, $\frac{2}{3}$ lin. broad, truncate; lobes of the lower lip oblong, scarcely $\frac{1}{2}$ lin. long. Style $1\frac{1}{4}$ lin. long, truncate and somewhat triangular at the apex.

Upper Guinea. Togo: near Lome, *Warnecke*, 201!

24. **S. Baumannii,** *Engl. in Engl. Jahrb.* xxiii. 515, *t.* 12, *figs. O—T.* A tall glaucous-green glabrous herb with a short stock and strong brănched roots; stems 2–4 or sometimes more, slender, $1\frac{1}{2}$–3 ft. high, sometimes sparingly branched near the middle, terete below with long internodes, quadrangular above with shorter internodes. Leaves all small, scale-like, closely adpressed to the stem, the lower ovate or oblong-ovate, acuminate, only $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long and 1 lin. broad, opposite. Spikes very slender, 4–12 in. long, remotely-flowered below; bracts

opposite, lanceolate, $1\frac{1}{2}$–$2\frac{3}{4}$ lin. long, acuminate, glumaceous, concave; bracteoles subulate, 1–$1\frac{3}{4}$ lin. long. Calyx $3\frac{1}{2}$–4 lin. long, narrow, about 15-nerved, glabrous except for a few minute hairs on the margins of the teeth, rigid, 4-toothed (or sometimes with the uppermost tooth present but very minute); teeth narrowly lanceolate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, acuminate, rigid. Corolla dark yellow, glabrous outside; tube 4–5 lin. long, narrow, slightly curved and inflated above the calyx; limb 2-lipped, both lips being strongly recurved in the dried state; upper lip deeply 3-lobed; lateral lobes lanceolate, $\frac{2}{3}$ lin. long; uppermost lobe much broader, shortly bifid; lower lip linear, 1–$1\frac{1}{2}$ lin. long. Style $1\frac{1}{2}$ lin. long. Capsule narrowly oblong, about 3 lin. long.—Engl. in Schlechter, Westafr. Kautschuk-Exped. 314.

Upper Guinea. Sierra Leone, *Afzelius, Scott-Elliot*, 5085! Togo: Misahöhe, *Baumann*, 29; near Quamikrum, *Schlechter*, 12945!

Imperfectly known species.

25. **Buchnera linearifolia,** *Schumach. & Thonn. Beskr. Guin. Pl.* 279. Root simple, remotely scaly, white. Stem very often solitary, quite simple, prismatic-quadrangular, very scabrid with minute adpressed hairs, about 1 ft. high, erect. Leaves opposite, linear, scarcely $\frac{1}{2}$ lin. long, quite entire, distant below, imbricate above, adpressed, acute, gradually attenuate at the base, very scabrid like the stem. Flowers axillary, solitary, sessile, flesh-coloured, twice as long as the leaves. Calyx tubular, erect, 5-toothed, covered with adpressed hairs; uppermost tooth least, the others approximate in pairs. Corolla tubular, pubescent outside; tube 3 times longer than the calyx, erect, cylindric below, gradually dilated and recurved at the throat; limb 2-lipped, gaping; upper lip obtuse, unequal on the margin; lower lip 3-fid, with linear acute lobes. Ovary oblong, quite glabrous, having a nectar-bearing gland at the base. Style simple, as long as the stamens; stigma rather thick, semi-bifid.—Benth. in DC. Prodr. x. 499.

Upper Guinea. Gold Coast: in a valley near Fredriksburg (Cape Coast Castle), *Thonning*.

This is evidently a *Striga*.

42. CYCNIOPSIS, Engl. in Engl. Jahrb. xxxvi. 233.

Flowers as in *Striga*, but the ovary differs in having less thickened placentas, which only slightly project into the cells, the seeds are much fewer and very much larger.—Small perennial herbs having procumbent branches with short internodes. Leaves small, opposite, almost sessile, sometimes secund. Flowers axillary, subsessile.

Species 3, all in Tropical Africa, 1 extending to South-west Arabia.

Corolla-tube 11–15 lin. long; limb 9–12 lin. in diam.	1. *C. humifusa*.
Corolla-tube 8–12 lin. long; limb 7–9 lin. in diam.	
Leaves obtuse, rounded at the base; corolla-tube contracted or not enlarged above the curve	2. *C. obtusifolia*.

Leaves acute or subacute, cuneate at the base; corolla-tube gradually enlarged from the curve to the apex	3. *C. minima.*

1. **C. humifusa,** *Engl. in Engl. Jahrb.* xxxvi. 233. A very small perennial prostrate herb, branched from the base; branches very slender, creeping, often short, but sometimes nearly 1 ft. long, more or less strigose. Leaves opposite, obovate-oblong, oblong-elliptic or sometimes lanceolate, 3–5 lin. long including the very short petiole, $\frac{3}{4}$–$1\frac{3}{4}$ lin. broad, obtuse, sparingly strigose on the underside of the midrib and along the margins, somewhat horny along the margins. Flowers few, axillary at the base of the branches; peduncles $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bracteoles 2, ovate-spathulate, obtuse, about 3 lin. long and 1 lin. broad. Calyx tubular, 6–$7\frac{1}{2}$ lin. long, about $1\frac{1}{2}$ lin. broad, 10-ribbed or -nerved, very sparingly strigose chiefly along the margins of the lobes, slightly curved; lobes oblong-lanceolate, obtuse, $2\frac{1}{2}$–3 lin. long, $\frac{3}{4}$ lin. broad. Corolla-tube 11–15 lin. long, $\frac{3}{4}$ lin. broad below, slightly curved and inflated at the apex, rather densely-glandular pubescent, densely bearded at the throat inside; limb $\frac{3}{4}$–1 in. in diam., rather firm in texture, 4-lobed; lobes broadly obovate, $4\frac{1}{2}$–7 lin. long, 4–8 lin. broad, densely and prominently veined, the upper slightly emarginate and broader than the others. Anthers oblong, about $\frac{3}{4}$ lin. long; filaments glabrous. Style $\frac{2}{3}$–1 in. long, clavate at the apex. Capsule oblong, somewhat compressed, subtruncate, as long as the calyx.—*Browallia humifusa*, Forsk. Fl. Ægypt.-Arab. 112. *Buchnera humifusa*, Vahl, Symb. Bot. iii. 81. *Striga humifusa*, Benth. in Hook. Comp. Bot. Mag. i. 362. *S. humilis*, Hochst. in Flora, 1844, 101; A. Rich. Tent. Fl. Abyss. ii. 131. *Rhamphicarpa humilis*, Hochst. in Flora, 1844, 101, and ex Benth. in DC. Prodr. x. 504. *Cycnium humifusum*, Benth. et Hook. f. Gen. Pl. ii. 969; Engl. Hochgebirgsfl. Trop. Afr. 383.

Nile Land. Abyssinia: Samen; near Enjedcap, *Schimper*, 1000! Begemeder; near Debra Tabor, 6500 ft., *Schimper*, 1384! Shoa, *Petit!* 6550 ft., *Ellenbeck*, 1540; and without precise locality, *Plowden! Schimper*, 84!

Also in South-west Arabia.

2. **C. obtusifolia,** *Skan.* A small slender perennial prostrate herb, branched from the base; branches about $\frac{1}{4}$ lin. thick, from a few lines up to 8 in. long, strigose; internodes $2\frac{1}{2}$–$3\frac{3}{4}$ lin. long. Leaves opposite, elliptic or ovate-elliptic, $1\frac{3}{4}$–$3\frac{1}{2}$ lin. long, $1\frac{1}{4}$–$2\frac{3}{4}$ lin. broad, entire, obtuse, rounded at the base, very shortly petiolate, covered especially on the upper side with hairs thickened at the base, often scabrid. Flowers subsessile, axillary along the branches from the base upwards, 1 to each pair of leaves. Bracteoles oblong-lanceolate, 2 lin. long, $\frac{1}{2}$ lin. broad, somewhat obtuse, hispidly hairy on the margins and on the underside of the midrib. Calyx tubular, $3\frac{1}{2}$–$5\frac{1}{4}$ lin. long, scarcely 1 lin. broad at the base, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. broad above, 10-ribbed, hispidly hairy, 5-lobed; lobes narrowly oblong, $1\frac{1}{4}$–$2\frac{3}{4}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, obtuse or acute. Corolla apparently white; tube $8\frac{1}{2}$–12 lin. long, $\frac{1}{2}$–$\frac{2}{3}$ lin. broad in the

lower part, distinctly curved and inflated near the apex, slightly contracted or not enlarged above the curve, somewhat densely glandular-pilose ; limb $\frac{2}{3}$–$\frac{3}{4}$ in. in diam., distinctly 2-lipped ; upper lip obcordate, $3\frac{1}{2}$ lin. long, nearly 4 lin. broad ; lobes of the lower lip narrowly obovate, $3\frac{1}{2}$–$4\frac{1}{4}$ lin. long, the median one slightly longer than the others, $2\frac{1}{4}$-3 lin. broad, rounded at the apex. Anthers oblong, nearly $\frac{2}{3}$ lin. long, obtuse. Style 6–$7\frac{1}{2}$ lin. long, clavate at the apex. Capsule (immature) ovoid, compressed, 2 lin. long, $1\frac{1}{4}$ lin. broad.

Nile Land. Uganda: Nandi District, *Johnston !* Elgon District, *James !* between Kikuya and Eldama Ravine, *Whyte !* British East Africa : Nairobi, *Perceval !*

3. **C. minima,** *Engl. in Engl. Jahrb.* xxxvi. 233, *with figure.* Very closely allied to *S. obtusifolia*, from which it differs in the following characters : Leaves acute or subacute, cuneate at the base. Calyx-lobes linear-triangular, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, $\frac{1}{3}$–$\frac{1}{2}$ lin. broad. Corolla-tube $\frac{2}{3}$ lin. long, $\frac{1}{3}$ lin. broad at the base, slightly curved about $\frac{1}{2}$ in. above, gradually enlarged from the curve to the apex, where it is slightly more than 1 lin. broad, less pubescent. Style $4\frac{1}{2}$ lin. long.

Nile Land. Somaliland : between Gallaboda and Jidda, 4250-4600 ft. *Ellenbeck*, 1207 !

A fragment in the British Museum, collected by Hinde at Machakos, in British East Africa, appears to be this species.

43. **STRIGINA,** Engl. in Engl. Jahrb. xxiii. 516, t. 13, A—H.

Calyx cylindrical, narrow, 5-nerved, equally 5-toothed ; teeth erect, linear, acute, ciliolate, about $\frac{1}{6}$ the length of the tube. Corolla-tube cylindrical, very narrow, slightly exceeding the calyx, curved at the top ; limb 2-lipped ; upper lip oblong, slightly notched ; lower lip 3-lobed ; lobes spreading, oblong or spathulate, rounded. Stamens 2, attached to the mouth of the tube at the base of the upper lip ; filaments very short ; anthers unequally 2-celled ; staminodes 2, between the lobes of the lower lip, short, filiform. Ovary elongate-ovoid, glabrous ; style glabrous, slightly overtopping the stamens ; stigma 2-lobed ; lobes obovate. Capsule 2-celled, 2-valved, dehiscing by the dissepiments. Seeds ovoid, longitudinally about 10-ribbed.

The only species.

1. **S. pusilla,** *Engl. in Engl. Jahrb.* xxiii. 516, *t.* 13, *A—H.* An erect (annual ?) fibrous-rooted nearly glabrous herb, 2–3 in. high. Stems very slender, branching from the base, quadrangular, thickened at the nodes, densely leafy. Leaves linear, 2–3 lin. long, acute, erect. Flowers solitary, terminal, slightly overtopping the leaves. Corolla-limb about 1 lin. across.

Mozamb. Dist. German East Africa : Karagwe ; Ihangiro, *Stuhlmann*, 3367

Description wholly from Engler. The plant, judging from Engler's figure, has the appearance of a diminutive species of *Striga*, from which genus it differs in having only two perfect stamens, which are inserted in the mouth of the tube, at the base of the upper lobe or lip of the corolla.

44. **RHAMPHICARPA**, Benth.; Benth. et Hook. f. Gen. Pl. ii. 969.

Calyx campanulate, 5-fid; teeth or lobes usually acuminate. Corolla-tube slender, elongated, straight or incurved, sometimes gibbous near the apex; limb broad, spreading, more or less distinctly 2-lipped; lobes 5, obovate or suborbicular, the upper 2 inside and usually more connate than the lower. Stamens 4, didynamous, included in the tube; anthers 1-celled, vertical, dorsifixed; connective very shortly acuminate at the apex. Style thickened or clavate above. Ovules numerous in each cell. Capsule ovate or suborbicular, compressed contrary to the septum, nearly always oblique and produced at the apex into an incurved rarely straight beak (obtuse or retuse in *R. cameroniana*), dehiscing loculicidally, often by the upper suture only. Seeds numerous, $\frac{1}{4}$ to nearly $\frac{1}{2}$ lin. long, obovoid, ellipsoid, oblong or subclavate, often truncate at both ends; testa reticulate or longitudinally striate, smooth or tuberculate.—Herbs or undershrubs, probably sometimes parasitic, often drying black, erect or decumbent, more or less branched, glabrous or hairy. Leaves opposite below, alternate above, often narrow, entire, toothed or pinnatisect. Flowers in the axils of the upper leaves, pedicellate or rarely subsessile; pedicels usually minutely bibracteolate. Corolla rather large, white, purple, pink or red.—*Macrosiphon*, Hochst. in Flora, 1841, 373.

Species 25, mostly African, with 1 in Transcaucasia, 1 in India, and 2 in Australia.

Leaves pinnatisect or bipinnatisect.
- Pedicels $\frac{1}{4}$–$1\frac{1}{2}$ (usually $\frac{1}{2}$–$\frac{3}{4}$ in.) long; calyx glabrous; corolla-tube 1–$1\frac{1}{2}$ in. long . . . . 1. *R. fistulosa.*
- Pedicels $\frac{1}{2}$–$1\frac{1}{2}$ lin. long; calyx pilose; corolla-tube 6–11 lin. long.
  - Corolla-tube 6 lin. long; limb 4-6 lin. in diam. . 2. *R. recurva.*
  - Corolla-tube $7\frac{1}{2}$–11 lin. long; limb 9–12 lin. in diam.
    - Calyx-lobes $6\frac{1}{2}$–$7\frac{1}{4}$ lin. long . . . . 3. *R. angolensis.*
    - Calyx-lobes $1\frac{1}{2}$–2 lin. long . . . . 4. *R. Meyeri-Johannis.*

Leaves entire or toothed.
- Corolla-tube distinctly gibbous near the apex.
  - Leaves more or less toothed, usually lanceolate or oblong.
    - Leaves entire below the middle, toothed at the apex . . . . . 5. *R. Albersii.*
    - Leaves toothed or lobed near the base, often entire at the apex.
      - Capsule obliquely ovoid, beaked.
        - Leaves several times longer than broad; corolla-tube $1\frac{1}{4}$ in. long; limb $1\frac{1}{3}$ in. in diam. . . . . 6. *R. veronicæfolia.*

Leaves only about twice as long as broad; corolla-tube 8–9 lin. long; limb 11–12 lin. in diam. . . . . 7. *R. suffruticosa.*
Capsule broadly obovoid, subtruncate or obcordate at the apex, not beaked . . 8. *R. cameroniana.*
Leaves quite entire, linear . . . . . 9. *R. Jamesii.*
Corolla-tube not gibbous.
Flowers axillary; uppermost leaves usually without flowers in their axils; stems more or less procumbent.
Leaves 5–14 lin. broad; pedicels 9–24 lin. long; calyx-lobes broadest in the middle . . 15. *R. herzfeldiana.*
Leaves 1–5 lin. broad; pedicels 2–9 lin. long; calyx-lobes broadest at the base.
Stems numerous; calyx divided below the middle; corolla-lobes oblong or ovate . 16. *R. multicaulis.*
Stems few; calyx not divided below the middle; corolla-lobes broadly obovate . 17. *R. montana.*
Flowers in terminal racemes or in the axils of the uppermost leaves; stems erect except in *R. ajugifolia*.
Calyx pubescent, often densely.
Pedicels usually about 9 lin. long . . . 18. *R. Heuglini.*
Pedicels up to $1\frac{1}{4}$ lin. long.
Stems decumbent; plant densely long-pilose . . . . . 14. *R. ajugifolia.*
Stems erect; plant shortly pilose.
Leaves 3–8 lin. long, 1–$2\frac{1}{2}$ lin. broad, often entire.
Plant up to $3\frac{1}{4}$ ft. high; corolla-tube 8–10 lin. long; calyx-lobes deltoid, $1\frac{1}{4}$–2 lin. long . . 10. *R. asperrima.*
Plant only a few inches high; corolla-tube $6\frac{1}{2}$–$7\frac{1}{2}$ lin. long; calyx-lobes narrowly triangular, $\frac{3}{4}$–$1\frac{1}{4}$ lin. long . . . . . 11. *R. Ellenbeckii.*
Leaves 6–18 lin. long, 2–6 lin. broad, all more or less toothed.
Flowers distant; calyx $4\frac{1}{2}$–$5\frac{3}{4}$ lin. long; lobes $2\frac{1}{2}$ lin. long . . 12. *R. Volkensii.*
Flowers close together; calyx $3\frac{3}{4}$ lin. long; lobes $1\frac{1}{4}$ lin. long . . 13. *R. spicata.*
Calyx glabrous or nearly so.
Pedicels 2–18 lin. long; calyx 4–5 lin. long; corolla-limb $\frac{1}{2}$–2 in. in diam.
Upper leaves and calyx-lobes distinctly hook-like . . . . . 20. *R. hamata.*
Upper leaves and calyx-lobes not hook-like or less distinctly so . . . . 19. *R. tubulosa.*
Pedicels about 4 in. long; calyx 7–$11\frac{1}{2}$ lin. long; corolla-limb 3 in. long, $2\frac{1}{2}$ in. broad . . . . . 21. *R. aquatica.*

1. **R. fistulosa,** *Benth. in DC. Prodr.* x. 504. An erect usually very much branched herb, from a few inches up to 4 ft. high, usually

about 1 ft. high; stem more or less distinctly quadrangular, glabrous; branches erect-spreading. Leaves pinnatisect or sometimes bipinnatisect, up to 3 in. long; segments 2–4 or sometimes more on each side, often opposite, narrowly linear, somewhat obtuse, the lower usually $\frac{1}{2}$–$\frac{3}{4}$ in. long, the upper shorter, densely covered along the margins with minute whitish callosities. Pedicels $\frac{1}{4}$–$1\frac{1}{2}$ (often $\frac{1}{2}$–$\frac{3}{4}$) in. long, erect-spreading, somewhat rigid; bracteoles 2, narrowly linear, $\frac{3}{4}$–$1\frac{1}{2}$ lin. long, often opposite, at or near the middle of the pedicels. Calyx broadly campanulate, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long and about as broad; tube $\frac{1}{2}$–$\frac{3}{4}$ lin. long; lobes erect-spreading, ovate to lanceolate, subulate-acuminate at the apex, glabrous except for a few whitish callosities. Corolla white, 1–$1\frac{3}{4}$ in. long, minutely and sparingly pubescent, very thin; tube straight, about $\frac{2}{3}$ lin. broad in the lower part, about $1\frac{1}{4}$ lin. broad at the apex; limb 5–9 lin. in diam.; lobes suborbicular, 2–$3\frac{1}{2}$ lin. in diam. Capsule ovoid, very much compressed, 4–$5\frac{1}{2}$ lin. long without the beak, 3–4 lin. broad, almost 2-winged; beak straight or nearly straight, 3–4 lin. long. Seeds oblong, about $\frac{1}{3}$ lin. long; testa coarsely reticulate.—A. Rich. Tent. Fl. Abyss. ii. 133; Oliver in Trans. Linn. Soc. xxix. 122; Schweinf. Beitr. Fl. Aethiop. 100; Engl. in Engl. Jahrb. xxviii. 480; Hiern in Cat. Afr. Pl. Welw. i. 778, and in Dyer, Fl. Cap. iv. ii. 398; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 45; S. Moore in Journ. Bot. 1900, 468. *R. longiflora*, Benth. in Hook. Comp. Bot. Mag. i. 368, partly, not of Benth. in DC. Prodr. x. 504; Durand & Schinz, Études Fl. Congo, i. 211; De Wild. Études Fl. Bas- et Moyen-Congo, i. 74. *Macrosiphon fistulosus*, Hochst. in Flora, 1841, 374. *M. elongatus*, Hochst. l.c.

Upper Guinea. Senegal: St. Louis Island, *Leprieur!* Northern Nigeria: Nupe; Jeba, on the Niger, *Barter*, 1713!

Nile Land. Nubia: island in the Nile near Dabbe, *Ehrenberg.* Abyssinia: Shireh, *Petit! Quartin-Dillon*; near Gapdia and Gafta, *Schimper*, 826! near Sanka-Berr, *Schimper*, 1220! Kordofan: Mount Arashkol, *Kotschy*, 77a! 77b! and without precise locality, *Kotschy*, 63! Gazelle River, *Schweinfurth*, 47! 1139! Meshra, *Schweinfurth*, 1231! Uganda: Madi, *Speke & Grant!*

South Central. Congo Free State: between Leopoldville and Mombazi (Mbasi), *Gillet*; Lusambo, *Duchesne.*

Lower Guinea. Angola: Pungo Andongo; banks of the River Cuanza, near Cavallo, *Welwitsch*, 5889! Mata Lucala, *Welwitsch*, 5862! 5889b! Lower Congo: Stanley Pool, *Hens*, 96! *Schlechter*, 12557! and without precise locality, *Smith!*

Mozamb. Dist. German East Africa: Uhehe; near Makenera, *Goetze*, 709! British Central Africa: Nyasaland; Umbaka River, *Scott!* Nyika Plateau, 8000 ft. *McClounie*, 96! near Mount Chiradzulu, *Cameron*, 100! Rhodesia: Buluwayo, *Rand*, 387.

Also in Madagascar and South Africa.

2. **R. recurva,** *Oliver in Trans. Linn. Soc.* xxix. 122, *t.* 87, *fig. A.* An erect branched slender annual herb about 1 ft. high; stem somewhat woody, obscurely quadrangular; branches bifariously strigillose. Leaves pinnatisect or bipinnatisect, opposite or the upper alternate, about 1 in. long, the floral shorter; segments narrowly lanceolate, scabrid with white points. Pedicels 1 lin. long; bracteoles narrowly

linear, 1½ lin. long. Calyx campanulate, sparingly setulose, 2½ lin. long, 1¼ lin. broad; lobes lanceolate, acuminate, 1½ lin. long, recurved. Corolla white; tube about ½ in. long, glandular-puberulous, somewhat curved; limb ⅓–½ in. in diam.; upper lip bifid; segments shortly or quadrately ovate; segments of the lower lip obovate.—*Cycnium recurvum*, Engl. Pfl. Ost-Afr. C. 361.

Mozamb. Dist. German East Africa: Karagwe, *Speke & Grant!* Uniamwezi; Urambo, *Hannington!*

3. **R. angolensis,** *Engl. in Engl. Jahrb.* xviii. 74. An annual erect herb, 2–3 ft. high, branched above, thinly covered with white, rather long or short, sometimes glandular hairs; stem obtusely tetragonal, 4-furrowed, sparingly branched above. Leaves all opposite, shortly petiolate, ovate or triangular, 1–2¼ in. long, ¾–1¼ in. broad at the base, pinnatisect or bipinnatisect; segments narrowly linear, acute. Flowers solitary, opposite, in the axils of the upper leaves. Pedicels 1–1½ lin. long, thick; bracteoles subulate-linear, 3½–4 lin. long, attached to the base of the calyx, ciliate at the base with long stiff hyaline hairs covered with shorter hairs above. Calyx 10 lin. long; tube cup-shaped, 10-ribbed, 2¾ lin. long, 1¾ lin. broad, covered with long stiff hyaline hairs; lobes narrowly linear, 6½–7¼ lin. long, spreading, long-acuminate, thinly covered with short adpressed hairs and some glandular ones. Corolla milk-white, rosy at the throat and in the tube, the whole soon turning bluish, at length blackish (*Welwitsch*); tube 11 lin. long, about 1 lin. broad, minutely glandular-pubescent, curved below the middle; limb 9–10 lin. in diam.; upper lip obreniform, 4 lin. long, 8½ lin. broad; lobes of the lower lip orbicular-obovate, 5 lin. in diam. Style 2½ lin. long, thickened above. Capsule (immature) ovate, compressed, ½ in. long including the oblique beak.—Hiern in Cat. Afr. Pl. Welw. i. 778.

Lower Guinea. Angola: Huilla; bank of the Lopollo River, *Welwitsch.* 5780!

4. **R. Meyeri-Johannis,** *Engl. Hochgebirgsfl. Trop. Afr.* 382. Stems 2 or 3, 1¾–2 ft. long, rather slender, branched, ascending, arising from a basal tuber, sparingly covered, as well as the branches and leaves, with spreading or somewhat strigose hairs; branches erect, 2½–8 in. long; internodes 1–2½ in. long. Leaves all opposite, shortly petiolate, ovate, pinnatisect or bipinnatisect, 1–1½ in. long, ¾–1¼ in. broad at the base; segments linear, in 5 or 6 pairs, becoming gradually shorter towards the apex, rather obtuse, the lower pinnatisect. Flowers solitary, opposite, in the axils of the upper leaves. Pedicels ½–1½ lin. long; bracteoles linear, 2½–3 lin. long. Calyx 4–4½ lin. long, densely covered with slender rather short somewhat reflexed hairs; tube cup-shaped, about 2½ lin. long, 2 lin. broad, 10-nerved; lobes triangular, 1½–2 lin. long, unequal, acuminate. Corolla-tube 7½–9 lin. long, 1¼ lin. broad near the base, 1⅓ lin. broad in the upper part, slightly curved, minutely glandular-pubescent; limb about 1 in. in diam.; upper lip obreniform, ⅓ in. long, ⅔ in. broad; lobes of the lower lip obovate-suborbicular, 5 lin.

long, 5½ lin. broad. Capsule obliquely ovoid, ½ in. long including the short acute beak, 3½ lin. broad, dehiscing along the upper suture only. Seeds oblong, somewhat angular, ⅓ lin. long, tuberculate.—*R. Meyeri*, Schweinf. in Höhnel, Lakes Rudolf and Stefanie, ii. 357. *Cycnium Meyeri-Johannis*, Engl. Pfl. Ost-Afr. C. 361, not of Engl. Hochgebirgsfl. Trop. Afr. 383.

Mozamb. Dist. German East Africa: Kilimanjaro, 6500–15,700 ft., *Teleki. Meyer*, 266, *Höhnel*, 139, *Volkens*, 1919!

5. **R. Albersii,** *Skan.* An erect branched undershrub upwards of 1 ft. high; stem obscurely quadrangular, 1½ lin. thick or more, glabrescent below, rather densely covered with short slender spreading hairs above; upper internodes 1–1¼ in. long; branches opposite, subterete, pubescent. Leaves opposite or subopposite, very shortly petiolate, cuneate-oblong, ⅔ in. long, ⅓–½ in. broad, obtuse, shortly white-pilose especially on the nerves beneath, entire below the middle, crenate-serrate above, rather thick; teeth 3–5 on each side. Flowers few, in the axils of the uppermost leaves. Pedicels about 1 lin. long; bracteoles linear, 1½ lin. long, acute. Calyx campanulate, 3¾ lin. long, 10-ribbed, sparingly hispid chiefly on the ribs; lobes narrowly deltoid, 1¼–1½ lin. long, ¾–1 lin. broad at the base, acute, erect. Corolla pale lilac; tube 12–13 lin. long, puberulous, slightly gibbous about 2½ lin. from the apex; limb about ¾ in. in diam. Ovary obliquely ovoid, 1¾ lin. long, 1¼ lin. broad, compressed; style 2½ lin. long, somewhat clavate above.—*Cycnium Albersii*, Engl. in Engl. Jahrb. xxxvi. 231.

Mozamb. Dist. German East Africa: Usambara: Mgrema, near Kwai, about 5300 ft., *Albers*, 419!

6. **R. veronicæfolia,** *Vatke in Linnæa*, xliii. 312. An annual? hispid herb. Leaves similar to those of certain forms of *Veronica longifolia*, the lower shortly petiolate, the upper sessile, mostly opposite, oblong-linear, somewhat obtuse, up to 3½ in. long and 7½ lin. broad, more or less pinnatifid-incised at the base, coarsely serrate above, entire at the apex; upper floral leaves linear, quite entire, cuspidate, puberulous on both sides, then glabrate. Pedicels up to 1 lin. long. Calyx-tube longer than the pedicels; lobes ovate, acuminate, about 2 lin. long and ¾ lin. broad. Corolla rose; tube 1–1¼ in. long, glabrous, gibbous 2½ lin. from the limb; limb 1⅓ in. in diam.; upper lip emarginate. Capsule obliquely ovoid, beaked.—*Cycnium veronicifolium*, Engl. Pfl. Ost-Afr. C. 361.

Nile Land. British East Africa: Ukamba; by the River Tiwa, *Hildebrandt*, 2753; near Pemba River, *Kässner*, 351!

Mozamb. Dist. German East Africa: Usambara; Duga, *Holst*, 3217!

Holst's specimen, determined by Dr. Engler, differs slightly from Vatke's description. Its leaves are not more than 2 in. long, the calyx-lobes are only 1½ lin. long, and the corolla-tube is distinctly puberulous.

7. **R. suffruticosa,** *Skan.* An erect sparingly branched herb or undershrub up to 3¼ ft. high; branches ¾–1 lin. thick, obscurely

quadrangular, sparingly and often bifariously pubescent; upper internodes 1½–2 in. long. Leaves mostly opposite, shortly petiolate or subsessile, deltoid-ovate to ovate-lanceolate or oblong, ¾–1¾ in. long, ⅓–1 in. broad, often deeply pinnatifid at the base, serrate-dentate above, acute or obtuse, covered with fine or short and stiff hairs; lobes and teeth broad, acute; floral leaves lanceolate, entire, 4–7 lin. long. Flowers opposite, in a loose stiff terminal raceme. Pedicels ½–1¼ lin. long; bracteoles linear, about 1 lin. long, or quite absent. Calyx campanulate, 3–5 lin. long, 2–3 lin. broad, 10-ribbed, with a few hispid hairs chiefly on the margins of the lobes; lobes ovate or elongate-triangular, 1½–2 lin. long, ¾–1 lin. broad, shortly acuminate. Corolla pale violet; tube ⅔–¾ in. long, nearly 1½ lin. broad below, gibbous 2 lin. from the limb, glandular-pubescent; limb 11–12 lin. in diam.; upper lip obovate-orbicular, 5½ lin. long, 6½ lin. broad, bifid; lobes of the lower lip obovate, 4 lin. long, 5–5½ lin. broad. Style only 2 lin. long, broadly clavate at the apex. Capsule obliquely deltoid-ovoid, 7–8½ lin. long including the beak, much compressed, dehiscing along the upper suture only; beak acuminate, placed at a right angle to the pedicel. Seeds about ½ lin. long, truncate at both ends; testa reticulate, scabrid.—*Cycnium suffruticosum*, Engl. in Engl. Jahrb. xxviii. 479.

Mozamb. Dist. German East Africa: Usambara, *Buchwald*, 96! Magila, 1000 ft., *Kirk!* Ukami; South Uluguru, 3900 ft., *Goetze*, 231!

8. **R. cameroniana,** *Oliver in Journ. Linn. Soc.* xv. 95. An erect herb 1 ft. high or more; stem sparingly branched, quadrangular, 4-sulcate, nearly glabrous. Leaves sessile or subsessile, few, linear-lanceolate or linear, ⅓–¾ in. long, ¾–1 lin. broad, acute, somewhat scabrid, often with 1 or 2 narrow acute teeth on each side at the base. Flowers racemose. Pedicels ¾–1½ lin. long; bracteoles 2, linear-subulate, ¾–1 lin. long, attached to the base of the calyx. Calyx tubular-campanulate, 3–4¼ lin. long, 10-ribbed, glabrous or nearly so; lobes lanceolate, 1¼–2 lin. long, acute. Corolla apparently white, minutely and sparingly pubescent; tube 10–12 lin. long, cylindric, slender, slightly curved, gibbous near the apex; limb spreading, nearly 1½ in. in diam.; lobes broadly obovate, rounded at the apex. Capsule broadly obovoid, 3½–4 lin. long and broad, subtruncate or obcordate at the apex, straight or slightly oblique, not beaked; valves coriaceous, retuse.—*Cycnium cameronianum*, Engl. Pfl. Ost-Afr. C. 361.

Mozamb. Dist. Lake Tanganyika, *Cameron!*

9. **R. Jamesii,** *Skan.* An erect herb, 1½ ft. high or more, almost glabrous and smooth, drying a shining black; stems rigid, very sparingly branched, about 1½ lin. thick; branches up to 1 ft. long or more, erect; internodes up to 2¾ in. long. Leaves (lowermost not seen) opposite, linear, 1–4 (usually 2–3) in. long, ¾–1¾ lin. broad, acute, entire, thick, sprinkled over with flat whitish callosities. Flowers in distant pairs arranged in terminal spike-like racemes, which become 1 ft. long; bracts similar to the leaves but smaller, the lowermost about 1 in. long, decreasing in length upwards to 3 lin. Pedicels mostly only about ½ lin.

long, in fruit sometimes 1½ lin. long; bracteoles 0. Calyx campanulate, 4½ lin. long, minutely pulverulent, furnished on the lobes with a few whitish callosities, prominently 10-ribbed; lobes triangular-lanceolate, 2–2½ lin. long, about 1 lin. broad at the base, acuminate. Corolla-tube curved, 12–13 lin. long, 1¼ lin. broad below, distinctly gibbous about 2 lin. from the apex, densely pubescent; limb 1¼–1½ in. in diam.; upper lip very broadly obcordate, 7–8 lin. long, 8–9 lin. broad; lobes of the lower lip broadly obovate, 8–10 lin. long and broad. Capsule obliquely ovate, 6–7 lin. long including the long beak, 4 lin. broad at the base.

Nile Land. Uganda: Kavirondo, 4000–5000 ft., *Scott-Elliot*, 7030! Elgon District, *James!*

10. **R. asperrima,** *Skan.* A branched erect undershrub, up to 3¼ ft. high; branches about 1 lin. thick, obscurely quadrangular, densely covered with grey deflexed hairs. Leaves mostly opposite, sessile or subsessile, lanceolate or oblong, ¼–⅔ in. long, 1–2½ lin. broad, densely covered with short hairs usually much thickened at the base, often very scabrid, quite entire or with a few coarse teeth, acute or subacute. Flowers mostly opposite, axillary, the upper forming a loose or sometimes crowded raceme. Pedicels ¾–1¼ lin. long; bracteoles linear, 2 lin. long, densely pubescent. Calyx campanulate, 3–4¼ lin. long, 2 lin. broad, 10-ribbed, very densely and shortly pubescent; hairs often thickened at the base; lobes deltoid, 1¼–2 lin. long, acute or acuminate. Corolla mauve-white; tube 8–10 lin. long, about 1⅓–1¾ lin. broad below, densely glandular-pubescent, slightly curved; limb ¾ in. long, ⅔ in. broad; upper lip obreniform, 3½ lin. long, 5¼–7 lin. broad, 2-lobed; lobes of the lower lip broadly obovate, 4–5 lin. long, 4 lin. broad. Style 1⅓–2½ lin. long, thicker in the upper part. Capsule ovoid-ellipsoid, slightly oblique, 2¾ lin. long, 2¼ lin. broad, compressed above.—*Cycnium asperrimum*, Engl. in Engl. Jahrb. xxxvi. 231.

Nile Land. Galla Country; Arussi-Galla; near Ginea, 6600 ft., *Ellenbeck.* 1947!

Mozamb. Dist. German East Africa: Kilimanjaro, 4400 ft., *Johnston*, 101! Usambara; Umba Valley, *Smith!*

11. **R. Ellenbeckii,** *Skan.* A small erect undershrub scarcely 4 in. high; stems terete, rather densely white-pilose; internodes 2–3 lin. long. Leaves lanceolate, 3¾–6 lin. long, 1¼–1¾ lin. broad, entire, acute, narrowed at the base, sparingly white-pilose on both sides. Flowers few, in the axils of the upper leaves. Pedicels ¾ lin. long; bracteoles linear-lanceolate, 2 lin. long, ⅓ lin. broad, acute, white-pilose, inserted on the base of the calyx. Calyx campanulate, 3¼ lin. long, 10-ribbed, white-pilose; tube 2½ lin. long, 2 lin. in diam. at the apex; lobes narrowly triangular, ¾–1¼ lin. long, acute, somewhat spreading, white-pilose on both sides. Corolla-tube 6½–7½ lin. long, nearly 1¼ lin. broad at the base, slightly narrower at the apex, slightly curved above, glandular-puberulous; limb 8 lin. long, about 7 lin. broad; upper lip 3½ lin. long, 4½ lin. broad, shortly 2-lobed; lobes of the lower lip obovate, 3½ lin. long, 2½–3¼ lin. broad. Style only 1¾ lin. long, very

much thickened above.—*Cycnium Ellenbeckii*, Engl. in Engl. Jahrb. xxxvi. 231.

Nile Land. Galla Country: Arussi-Galla; Dennek rivulet, *Ellenbeck*, 1967!

12. **R. Volkensii,** *Skan.* An erect many-branched undershrub, up to $3\frac{1}{4}$ ft. high, everywhere except on the corolla more or less shortly strigose-pilose; branches ascending. Leaves mostly opposite, sessile or subsessile, lanceolate, $\frac{1}{2}$–$1\frac{1}{2}$ in. long or more, 2–6 lin. broad, coarsely few-toothed, obtuse or acute. Flowers rather few, in a loose terminal raceme. Bracts similar to the leaves but smaller. Pedicels 1 lin. long; bracteoles linear or lanceolate, 2–4 lin. long. Calyx tubular-campanulate, $4\frac{1}{2}$–$5\frac{3}{4}$ lin. long, $2\frac{1}{2}$ lin. broad at the apex of the tube, 10-ribbed, rather densely pilose; lobes deltoid-lanceolate, spreading, $2\frac{1}{2}$ lin. long, acuminate. Corolla pale rose-coloured; tube 8–9 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, cylindric, curved, minutely glandular-puberulous; limb $\frac{2}{3}$–1 in. in diam.; upper lip 5 lin. long, 6 lin. broad, deeply emarginate or bifid; lobes of the lower lip suborbicular or obovate, 5 lin. long, $4\frac{1}{2}$–5 lin. broad. Style $1\frac{3}{4}$ lin. long, thickened in the upper part. Capsule ovoid, included in the calyx.—*Cycnium Volkensii*, Engl. Pfl. Ost-Afr. C. 360, and in Engl. Jahrb. xxiii. 513.

Nile Land. British East Africa: 4000–6000 ft., Galunka, *Kässner*, 814, partly! Kapte Plateau, *Thomson!* Kikuya and on the road to Eldama Ravine, *Whyte*, 15!

Mozamb. Dist. German East Africa: between Mount Meru and Kilimanjaro, and on Kilimanjaro at Majame and Muengue, 3000–4900 ft., *Volkens*, 366, 1653.

Cycnium gallænse, Engl. in Ann. Istit. Bot. Roma, vii. 29 (Riva, 1257, from Gallaland), appears to be the same as the above. I have seen only a fragmentary specimen.

13. **R. spicata,** *Skan.* An erect sparingly branched herb, up to $1\frac{3}{4}$ ft. high, densely covered with short white deflexed hairs; internodes about 5 lin. long. Leaves oblong, the larger 10–12 lin. long, 5–6 lin. broad, rigid, shortly pilose on both sides, acute at apex and base, entire in the lower third, serrate above, with the midrib and lateral nerves prominent below; upper leaves smaller, passing into sparingly serrate or entire elliptic bracts. Flowers spicate, shortly pedicellate or sessile. Bracteoles linear, $1\frac{3}{4}$ lin. long, usually attached to the base of the calyx. Calyx campanulate, $3\frac{3}{4}$ lin. long, slightly incurved, hispidly hairy, prominently 10-ribbed; tube $2\frac{1}{2}$ lin. long, about 2 lin. in diam. at the mouth; lobes spreading, deltoid, $1\frac{1}{4}$ lin. long, the uppermost shorter. Corolla pale rose; tube $8\frac{1}{4}$–10 lin. long, $1\frac{1}{2}$ lin. broad at the base, slightly enlarged above, minutely glandular-puberulous; limb about 1 in. in diam.; upper lip 2-lobed, $\frac{1}{2}$ in. long, $\frac{3}{4}$ in. broad; lobes broadly oblong or obovate, $\frac{1}{3}$ in. long, $3\frac{1}{2}$ lin. broad; lobes of the lower lip broadly ovate, 5 lin. long, 5–$5\frac{1}{2}$ lin. broad. Capsule ovoid, included in the calyx.—*Cycnium spicatum*, Engl. in Engl. Jahrb. xxxvi. 232.

Mozamb. Dist. German East Africa: at the foot of the Pare Mountains between Sengani and Simba, 2300 ft., *Engler*, 1629!

14. **R. ajugifolia,** *Skan.* A decumbent herb, branched below, the branches, leaves, and calyces furnished with white hairs thickened at the base; branches curved, 8–10 in. long, greyish-violet, densely white-pilose; internodes $7\frac{1}{2}$–10 lin. long. Leaves obovate or obovate-cuneate, $7\frac{1}{2}$–10 lin. long, about 5 lin. broad, coarsely few-toothed, white-pilose, with some of the hairs thickened at the base; teeth $\frac{1}{2}$–1 lin. long and broad. Flowers in the axils of the upper leaves. Pedicels 1 lin. long; bracteoles narrowly linear, $1\frac{1}{2}$–$3\frac{1}{2}$ lin. long, acute, densely pilose. Calyx $3\frac{1}{2}$–$5\frac{1}{2}$ lin. long, densely pilose outside, 10-ribbed; tube $1\frac{1}{2}$–2 lin. broad; lobes lanceolate, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, acute. Corolla-tube funnel-shaped, $8\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad near the base, slightly broader above the middle, glandular-puberulous; limb 7 lin. long, $6\frac{1}{2}$ lin. broad; upper lip $3\frac{1}{2}$ lin. long, $4\frac{3}{4}$ lin. broad, 2-lobed; lobes about 2 lin. long and broad, rounded; lobes of the lower lip broadly obovate, 3–$3\frac{1}{4}$ lin. long, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. broad. Ovary obliquely ovoid, compressed above, $1\frac{1}{4}$ lin. long, 1 lin. broad; style $2\frac{1}{4}$ lin. long, thickened above.—*Cycnium ajugæfolium*, Engl. in Engl. Jahrb. xviii. 74. *C. ajugifolium*, Engl. Pfl. Ost-Afr. C. 360.

Mozamb. Dist. German East Africa: probably Masai Highlands, *Fischer*, 104!

15. **R. herzfeldiana,** *Vatke in Linnæa*, xliii. 311. A weak branched straggling undershrub, usually densely covered on all the green parts with rather long soft hairs or sometimes with the leaves shortly hairy or glabrescent; stems 9–15 in. long or more, terete; branches often more than 6 in. long, slender, spreading; internodes 1–$1\frac{3}{4}$ in. long. Leaves usually opposite, shortly petiolate, ovate-lanceolate, ovate or lanceolate, $\frac{3}{4}$–2 in. long, 5–14 lin. broad, acute, more or less cuneate at the base, serrate-dentate, scabrid; lower teeth larger sometimes much larger, than the upper; petiole $\frac{3}{4}$–$2\frac{1}{2}$ lin. long. Flowers axillary, 1 or 2 to each pair of leaves. Pedicels $\frac{3}{4}$–2 in. long, often about $1\frac{1}{4}$ in. long; bracteoles linear, $3\frac{1}{2}$ lin. long, inserted on the base of the calyx or just below. Calyx 7–9 lin. long, accrescent; tube campanulate, 3–4 lin. long, 10-nerved; lobes broadly oblong to oblong-lanceolate, sometimes triangular, 4–$5\frac{1}{2}$ lin. long, $1\frac{1}{2}$–$2\frac{3}{4}$ lin. broad, acute or somewhat obtuse. Corolla-tube 9–11 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad, curved, sometimes distinctly gibbous above the middle, glandular-puberulous; limb 1–$1\frac{1}{4}$ in. in diam.; upper lip 5–7 lin. long, 7–8 lin. broad, emarginate; lobes of the lower lip obovate, 5–7 lin. long, $4\frac{1}{2}$–$6\frac{1}{2}$ lin. broad. Filaments bearded; anthers oblong, $1\frac{1}{4}$ lin. long. Style 1 lin. long, thickened in the upper part. Capsule suborbicular, slightly oblique, 7 lin. long including the beak, 6 lin. broad, much compressed; beak only about 1 lin. long. Seeds ellipsoid, $\frac{1}{3}$ lin. long; testa reticulate.—*R. herzfeldiana*, var.? *subauriculata*, Vatke, l.c. 312. *Cycnium herzfeldianum*, Engl. in Engl. Jahrb. xviii. 74, and in Ann. Istit. Bot. Roma, vii. 29; formæ *Holstii* and *subauriculata*, Engl. Pfl. Ost-Afr. C. 360. *C. Meyeri-Johannis*, Engl. Hochgebirgsfl. Trop. Afr. 383, not of Engl. Pfl. Ost-Afr. C. 361.

Wile Land. Galla Country: between Tumpé and Ciaffa, *Riva*, 1252. British East Africa: Ukamba; *Hildebrandt*, 2736! *Scott-Elliot*, 6310! Kapte Plateau,

5000–6000 ft., *Thomson !* Taita; Ndara Mountain, 1000 ft., *Hildebrandt*, 2440; Galunka, *Kässner*, 814! Uganda; Elgon District, *James !* Buddu, *Scott-Elliot*, 7479! and without precise locality, *Whyte !*

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Holst*, 3428! Kilimanjaro; Marangu, *Meyer*, 58, *Volkens*, 1233! Ugweno Mountain, *Meyer*, 191.

16. **R. multicaulis,** *Skan.* A perennial herb with a tuft of long fibrous roots; stems numerous, flagelliform, 6 in. long or more, procumbent or ascending, terete, pubescent (often bifariously); hairs very short, deflexed. Leaves mostly opposite, sessile, linear-lanceolate, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{3}{4}$–$1\frac{1}{2}$ lin. broad, narrowed at both ends, acuminate, sparingly and shortly pubescent, somewhat scabrid, remotely 1–3-toothed each side below the middle. Flowers axillary, few. Pedicels 7–9 lin. long; bracteoles linear, $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, inserted close to or at a short distance from the calyx. Calyx 9–10 lin. long, sparingly and shortly hairy chiefly on the ribs and margin of the lobes, 10-ribbed; tube cup-shaped, $3\frac{1}{2}$–4 lin. long, 3–$3\frac{3}{4}$ lin. broad, slightly broadest at the base; lobes linear-lanceolate or linear-oblong, 5–$6\frac{1}{2}$ lin. long, $1\frac{1}{4}$ lin. broad at the base, narrowed to the apex, shortly acuminate. Corolla-tube about $1\frac{1}{2}$ in. long, $1\frac{1}{4}$–2 lin. broad, glandular-puberulous; limb 2–$2\frac{1}{4}$ in. in diam.; upper lip 7–9 lin. long, about 1 in. broad, emarginate; lobes of the lower lip broadly elliptic or ovate, about 1 in. long, $9\frac{1}{2}$–11 lin. broad, obtuse. Style 2 lin. long, thickened and lanceolate in the upper part. Capsule (immature) ovoid, slightly oblique.

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith !*

17. **R. montana,** *N.E. Br. in Kew Bulletin*, 1901, 129. A small herb, more or less hispidly pubescent, sometimes villous or almost glabrous; stems $2\frac{1}{2}$–8 in. long, procumbent, slightly woody at the base; branches ascending. Leaves opposite or alternate, lanceolate or linear-lanceolate, $\frac{1}{2}$–1 in. long, 1–5 lin. broad, acute, usually acutely toothed especially near the base, rarely quite entire, more or less pubescent and scabrid. Flowers few, in the axils of the leaves at about the middle of the branches. Pedicels 2–9 lin. long; bracteoles narrowly linear, 1–2 lin. long. Calyx tubular-campanulate, usually $\frac{1}{3}$–$\frac{1}{2}$ lin. long, more or less hispidly hairy or villous; lobes triangular-lanceolate, 1–3 lin. long, acute or rarely obtuse. Corolla-tube curved, 11–16 lin. long, nearly cylindric, rather densely pubescent; limb 1–2 in. in diam.; upper lip 8–10 lin. long, 10–14 lin. broad, emarginate; lobes of the lower lip broadly obovate, 6–11 lin. long, 6–10 lin. broad. Capsule unknown.—Hiern in Dyer, Fl. Cap. iv. ii. 400.

Nile Land. British East Africa or Uganda: between Kikuyu and Eldama Ravine, 4000–6000 ft., *Whyte !*

Mozamb Dist. British Central Africa: Rhodesia; between Charter and Buluwayo, *Hon. Mrs. Evelyn Cecil*, 90! Bulawayo, *Rand*, 160!

Also in South Africa.

18. **R. Heuglini,** *Hochst. in Schweinf. Beitr. Fl. Aethiop.* 100. An erect herb 3–9 in. high, branched chiefly from the base: stems

slender, sparingly and shortly pubescent or sometimes villous. Leaves lanceolate-linear or lanceolate, ½–2 in. long, 1–5 lin. broad, acuminate or acute, much narrowed towards the base, more or less toothed or rarely entire, hispidly pubescent, sometimes scabrid; teeth 1–6 on each side, acute, mostly narrow and spreading, the lower sometimes up to 2½ lin. long. Flowers in the axils of the uppermost leaves. Pedicels from a few lines up to 2 in. long, usually about ¾ in. long: bracteoles linear, 1–3 lin. long, attached to the upper part of the peduncle or to the base of the calyx. Calyx tubular-campanulate, 3–6½ lin. long, about 2–2½ lin. broad above, usually sparingly hispidly hairy chiefly on the ribs; tube 1½–3½ lin. long; lobes lanceolate-triangular to ovate, 1½–3½ lin. long, acute. Corolla white, mauve or violet; tube ¾–1¼ in. long, glandular-pubescent, curved, slightly inflated in the upper part; limb 1–2 in. in diam.; upper lip 5–9 lin. long, 9–13 lin. broad, emarginate at the apex; lobes of the lower lip suborbicular-obovate, 5–9 lin. long and broad. Style 2¾–3 lin. long, thickened and lanceolate in the upper part. Capsule obliquely ovoid, ⅓–½ lin. long including the beak, dehiscing by the upper suture only; beak acuminate.—S. Moore in Journ. Linn. Soc. xxxvii. 191. *Cycnium Heuglinii*, Engl. Pfl. Ost-Afr. C. 361.

Nile Land. Soudan: near Khartoum, *Heuglin*; Meshra, *Schweinfurth*, 46! 1241! Bahr el Jebel, near Bor, *Broun!* Uganda: Lake Baringo, 3400 ft., *Johnston!* Buddu, 3900 ft., *Dawe*, 227! Elgon District, *James!* Mulema, *Bagshawe*, 230!

The specimens collected by Dawe and Bagshawe are much more hairy than the others.

Cycnium paucidentatum, Engl. in Ann. Istit. Bot. Roma, vii. 29, and in Engl. Jahrb. xxiii. 513 (*C. serratum*, var. *paucidentatum*, Engl. Pfl. Ost-Afr. C. 360) is probably not distinct from the above species. I can find no satisfactory character in the fragmentary specimens at Kew by which to distinguish it.

C. rubriflorum, Engl in Engl. Jahrb. xxx. 405, from Mpagara Land, Unyika (Goetze, 1402), described as having red flowers, is, I suspect, only a form of *Rhamphicarpa Heuglini*.

19. **R. tubulosa,** *Benth. in Hook. Comp. Bot. Mag.* i. 368. Apparently a perennial herb, probably parasitic, usually drying blackish; stem erect or ascending, ⅓–2 ft. (usually about 1 ft.) high, slender, simple or sparingly branched, glabrous or minutely and sparingly puberulous, subterete, 2-furrowed; internodes ½–2½ (usually 1½–2) in. long. Leaves opposite or subopposite, narrowly linear to lanceolate, 1–4 (often 1½–2½) in. long, 1–4 lin. broad, acute or acuminate, narrowed at the base, quite entire or remotely serrate, sometimes with 1 or 2 long teeth on each side at the base, often somewhat scabrid with minute white dots. Flowers axillary or sometimes supra-axillary, usually opposite, or forming a lax few-flowered raceme. Pedicels 2–18 (often 4–6) lin. long, sometimes 2 in. long in the fruiting stage; bracteoles quite absent or minute. Calyx campanulate, usually 4–5 lin. long, glabrous or sometimes sprinkled over with scabrid white dots, rarely sparingly ciliate on the teeth; tube 2–3½ lin. long; lobes narrowly lanceolate, triangular, rarely ovate-lanceolate,

1½–3 (sometimes up to 4) lin. long, often elongating after flowering, acuminate. Corolla pink, purple or white ; tube ¾–1 in. long, curved, glandular-puberulous ; limb ½–2 (usually 1–1½) in. in diam. ; upper lip 2½–7 lin. long, 4–11 lin. broad, more or less deeply two-lobed ; lobes of the lower lip obovate, 2½–8 lin. long and broad. Style 2–3 lin. long, thickened above. Capsule obliquely ovoid, ¼–½ in. long and broad, somewhat compressed, beaked.—DC. Prodr. x. 504 ; Hiern in Dyer, Fl. Cap. iv. ii. 399. *R. curviflora*, Benth. in Hook. Comp. Bot. Mag. i. 368. *R. serrata*, Klotzsch in Peters, Reise Mossamb. Bot. 228 ; Vatke in Oest. Bot. Zeitschr. 1875, 11. *Gerardia tubulosa*, Linn. f. Suppl. 279. *Cycnium tubulosum*, Engl. Pfl. Ost-Afr. C. 361. *C. serratum*, Engl. l.c. 360.

Nile Land. Uganda : 4th March from Numias, *Whyte !* Eldama Ravine and Mau, 7000–7500 ft., *Whyte !* and without precise locality, *Wilson*, 121 ! British East Africa : around Nairobi, *Whyte !* Machakos to Kikuyu, 5000–6000 ft., *Scott-Elliot*, 6598 !

Lower Guinea. German South-west Africa : Amboland ; Ombandya country, *Schinz*, 45 ! between Ukuambi and Ondonga, *Schinz !*

Mozamb. Dist. German East Africa : Ugalla River, *Boehm*, 127 ; Isimbiri, *Boehm*, 69 ; between Meru and Kilimanjaro, *Volkens*, 1612 ; Usagara Mountains, *Kirk !* between Lake Tanganyika and Lake Rukwa, 6000 ft., *Nutt !* Portuguese East Africa : Mozambique, *Forbes ! Peters ;* Quilimane, *Scott !* near Muata Manja, 3000 ft., *Kirk !* Luabo River, *Kirk !* British Central Africa : Nyasaland ; various localities, *Carson ! Scott-Elliot*, 8500 ! *Buchanan*, 113 ! *Waller ! Meller ! Whyte ! Kirk ! Cunningham*, 16 ! *Buchanan*, 1343 ! Moero Plateau, *Carson*, 16! Rhodesia : by the Zambesi, near Victoria Falls, *Allen*, 34 ! Mashonaland, *Bryce !* Ngami-land : near the Zouga, Tamalakane and Chobe Rivers, *McCabe*, 6 ! Okavango Valley, 3000 ft., *Lugard*, 271 by the Botletle River at Matabele Drift, *Lugard*, 4 !

R. tubulosa is evidently an extremely variable species. We have not seen the type of *R. serrata*, Klotzsch, but the description agrees with several specimens at Kew which we cannot satisfactorily separate from *R. tubulosa*. Engler (Pfl. Ost-Afr. C. 360–361) has given names to some extreme forms.

20. **R. hamata,** *Skan.* A herb 16–24 in. high ; stem straight, erect, simple or sparingly branched, nearly glabrous ; internodes 1⅓–3 in. long. Leaves sessile, linear, 15–22 lin. long, 1–1½ lin. broad, acute or very acute at the apex, cuneate at the base, remotely and sparingly toothed (2 or 3 teeth each side), glabrous, horny especially on the under side ; upper leaves narrowly linear, up to 1 in. long, ¾ lin. broad, entire, always distinctly hooked-revolute. Flowers few, axillary near the apex of the stem or branch. Pedicels 6–10 lin. long ; bracteoles 0. Calyx 4–5 lin. long, tuberculate chiefly on the lobes ; tube campanulate, 2 lin. long ; lobes lanceolate-linear, 2–3 lin. long, very acute, spreading. Corolla rose ; tube 10 lin. long, 1 lin. broad, cylindric, distinctly curved, shortly glandular-pilose ; limb 13–14 lin. in diam. ; upper lip ½ in. long, ¾ in. broad, 2-lobed ; lobes of the lower lip obovate-orbicular, 6–7½ lin. long, 5–7 lin. broad.—*Cycnium hamatum*, Engl. & Gilg in Baum, Kunene-Samb. Exped. 368.

Lower Guinea. Angola : near the mouth of the River Quatiri, 3600 ft., *Baum*, 403 !

21. **R. aquatica,** *Skan.* Stem glabrous, up to 3¼ ft. high ; branches erect, 12–16 in. long ; internodes 2½–4½ in. long. Leaves

narrowly linear, 2½–3⅓ in. long, 1½–2 lin. broad, the upper shorter and narrower, entire or sometimes here and there denticulate, subcartilaginous along the margin. Pedicels nearly 4 in. long, slightly supra-axillary; bracteoles 0. Calyx 7–11½ lin. long; tube campanulate, 4 lin. long; lobes elongate-triangular-acuminate or very narrowly linear, 3–7½ lin. long, about ½ lin. broad near the base, spreading. Corolla bright madder-coloured; tube about 1 in. long and 1½ lin. broad; limb about 3 in. long and 2½ in. broad; upper lip 2-lobed; lobes 8 lin. broad; lobes of the lower lip 10–12 lin. broad, the median about 1½ in. long, longer than the lateral. Capsule obliquely ovoid, beaked, 3½ lin. long, 3 lin. broad.—*Cycnium aquaticum*, Engl. in Engl. Jahrb. xxviii. 479.

Mozamb. Dist. German East Africa: Uhehe; growing in 1¾ ft. of water, in the Ifweme Marsh, near Tengulinyi, 5600 ft., *Goetze*, 690!

45. **CYCNIUM**, E. Meyer; Benth. et Hook. f. Gen. Pl. ii. 969.

Calyx long-tubular, 5-lobed or 5-toothed, 10-nerved or -ribbed. Corolla-tube elongated, straight or slightly incurved near the apex; limb usually large, spreading, somewhat 2-lipped; upper lip inside, very broad, emarginate or bifid; lower lip deeply 3-fid, with entire ovate, obovate or suborbicular lobes. Stamens 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, with the connective sometimes acuminate at the apex. Style thickened or clavate above. Ovules numerous in each cell. Capsule included in the calyx, 2-celled, ovoid or ellipsoid, somewhat fleshy, acute or obtuse, loculicidal or indehiscent? Seeds numerous, small, obovoid or ellipsoid; testa reticulate, subadpressed.—Rigid scabrid semi-parasitic herbs, erect or procumbent, drying black. Leaves mostly opposite or the upper alternate, oblong or lanceolate, usually toothed. Flowers axillary or racemose at the ends of the branches, sessile or shortly pedicellate, bibracteolate. Corolla white, pink, violet-rose or pale-yellow, often violet when dry.

Species 10 or 11, the others in South Africa.

* Calyx not slit on one side.

Stems procumbent or ascending; flowers axillary; corolla-tube 1½–3 in. long.

Calyx up to 2¼ in. long; corolla-tube up to 3 in. long; limb 2–4 in. in diam.

Corolla-tube often 1½ in. longer than the calyx . . . . . 1. *C. adonense.*

Corolla-tube only 5–6 lin. longer than the calyx.

Plant scabridly pubescent . . . . 2. *C. Verdickii.*

Plant glabrous or nearly so . . . . 3. *C. Buchneri.*

Calyx up to 1 in. long; corolla-tube up to 1¾ in. long; limb ½–1½ in. in diam.

Calyx 6–8 lin. long; corolla-tube 1½–1¾ in. long; limb ¾–1½ in. in diam. . . 4. *C. Camporum.*

Calyx 12 lin. long; corolla-tube 1–1¼ in. long; limb 6½–7½ lin. in diam.	5. *C. brachycalyx.*
Stems quite erect; flowers racemose; corolla-tube 10–12 lin. long	6. *C. questieauxianum.*
** Calyx slit on one side.	
Stems and underside of the leaves fulvous-tomentose; corolla-tube up to 2½ in. long	7. *C. tomentosum.*
Stems and leaves shortly hispid; corolla-tube 1¼ in. long	8. *C. erectum.*

1. **C. adonense,** *E. Meyer ex Benth. in Hook. Comp. Bot. Mag.* i. (1835), 368. A pubescent scabrid perennial robust herb with strong fibrous roots; stems often branched from the somewhat woody base, procumbent or ascending, from a few inches to a foot long or more, leafy. Leaves usually opposite, shortly petiolate or sessile, oblong or oblong-lanceolate, 1–3 (usually 2) in. long, ½–1 in. broad, serrate, crenate-serrate or incised-dentate, acute or acuminate, rarely obtuse, cuneate at the base. Flowers axillary. Pedicels 2–12 (often 4–6) lin. long; bracteoles linear, 2½–4 (rarely up to 8½) lin. long. Calyx tubular, ¾–1¾ (usually about 1¼) in. long, 3–3½ lin. broad at the top of the tube, often densely covered on the ribs with somewhat deflexed hairs and pulverulent or puberulous between the ribs, 10–12-ribbed; tube 7–12 lin. long; lobes oblong to lanceolate-triangular, rarely deltoid-ovate, 3½–8 lin. long, rarely 2 lin. long or less, ½–2¼ lin. broad, usually acute or shortly acuminate. Corolla white or lilac, often blackish when dry; tube 2¼–3 in. long, gibbous ½–⅔ in. from the limb, glandular-pilose; limb 2–3 in. in diam.; upper lip about 1 in. long and 1⅓ in. broad, deeply emarginate; lobes of the lower lip suborbicular broadly obovate, 11–14 lin. long, 10–13½ lin. broad. Style ½–¾ in. long, much flattened in the upper part. Capsule ovoid or elliptic, 6–7½ lin. long, 4½ lin. broad, fleshy, indehiscent? obtuse.—Benth. in DC. Prodr. x. 505; Oliver in Trans. Linn. Soc. xxix. 122, t. 88; Britten in Trans. Linn. Soc. ser. 2, Bot. iv. 29; Engl. in Engl. Jahrb. xxviii. 479; Durand & Schinz, Études Fl. Congo, i. 212; Hiern in Dyer, Fl. Cap. iv. ii. 395. *C. adoense*, Benth. & Hook. f. Gen. Pl. ii. 969; S. Moore in Journ. Bot. 1900, 468, and in Journ. Linn. Soc. xxxvii. 191. *C. longiflorum*, Eckl. & Zeyh. ex Oliver in Trans. Linn. Soc. xxix. 122. *Cycnium* sp. n., T. Thoms. in Speke, Nile, Append. 642.

Nile Land. Nile, *Petherick!* Uganda: Madi, *Speke & Grant!* Nandi, 7000 ft., *Scott-Elliot*, 7053! Mulema, *Bagshawe*, 229! Entebbe, 3900 ft., *Brown*, 2! and without precise locality, *Wilson*, 71!

South Central. Congo Free State: Kassai River; Koango, *Büttner.*

Mozamb. Dist. German East Africa: Ukami; between Mgeta and Mbakana, *Goetze*, 341; bed of the Mgasi, *Goetze*, 140; Uhehe; Muhinde Steppe, *Goetze*, 515; Urundi, 4000–5000 ft., *Scott-Elliot*, 8208! higher plateau north of Lake Nyasa *Thomson!* Portuguese East Africa: Makua Country; Namuli Hills, *Last!* near Lake Nyasa, *Johnson*, 448! Lower Zambesi; Shupanga, *Kirk!* British Central Africa: Urungu; Fwambo, *Carson*, 121! Tanganyika Plateau, *Carson!* Nyasaland; various localities, *Purves*, 64! *Whyte*, 71! 284! *Kirk! Waller! Meller! Scott-Elliot*, 8502! *Buchanan*, 32! 84! 1000! 1340! *Scott!* Rhodesia: Buluwayo, *Rand*, 161!

Also in South Africa.

C. adonense, var. *adscendens*, Oliver in Trans. Linn. Soc. xxix. 123, collected by Speke & Grant in Karagwe, Unyoro, &c., is only a small-flowered form.

2. **C. Verdickii,** *De Wild. Études Fl. Katanga*, 125. *t.* 6. Stems numerous, prostrate, ascending or erect, 5–6¼ in. long, scabridly pubescent especially towards the base and on the young parts, furnished with scarious bracts at the base; internodes 5–7½ lin. long. Leaves sessile, opposite or subopposite, oblong or oblong-lanceolate, 1–3 in. long (the middle ones usually longest), ¼–1 in. broad, long-cuneate at the base, almost petiolate, crenate-serrate, prominently nerved, with scattered hairs more numerous on the under side, especially on the nerves, scabrid. Flowers solitary or in pairs, slightly supra-axillary. Pedicels 2–6½ lin. long; bracteoles linear, 2½–3 lin. long, entire or 2-toothed, attached under the calyx or sometimes united more or less to it. Calyx tubular, 1½–2 in. long, with scattered hairs, scabrid; lobes triangular, 1¾–5 lin. long, acute or subacute. Corolla at first white, soon turning clear blue, at length violet; tube 2¼–3 in. long, narrow, straight, glandular-pubescent outside; lobes obovate, about 14 lin. long, the upper about twice as broad as the others and slightly bilobed at the apex. Ovary ovoid, glabrous, compressed.—*C. adonense*, Hiern in Cat. Afr. Pl. Welw. i. 777, not of E. Meyer.

Lower Guinea. Angola: Pungo Andongo; near Cazella, *Welwitsch*, 5868! Huilla; near Lopollo, *Welwitsch*, 5779!

South Central. Congo Free State: Katanga; Katanga Plateau, *Verdick*; near Lukafu, *Verdick*, 216, 355.

3. **C. Buchneri,** *Engl. in Engl. Jahrb.* xviii 73. Apparently a perennial herb; stem procumbent, branched, more than 1 ft. long, minutely pubescent or in places glabrescent; internodes 2–2½ lin. long. Leaves distant, shortly petiolate, oblong or the upper oblong-lanceolate, 2½–5 in. long, 7½–20 lin. broad, rigid, shining, glabrous below, minutely pubescent chiefly on the nerves at the base and slightly scabrid above, crenate-serrate, acute, with the nerves and densely reticulate veins prominent on both sides especially below; petioles 1–2 lin. long. Flowers axillary, opposite. Pedicels 5–9 lin. long; bracteoles linear, 1 lin. long. Calyx tubular, 2–2¼ in. long, 3½–4 lin. broad, glabrous; lobes 2–2½ lin. long and broad, rounded. Corolla white, blue-black when dry; tube 2½ in. long, 1¾–2 lin. broad, glandular-puberulous; limb up to 2¼ in. in diam.; lobes broadly obovate, 1 in. long, nearly 10 lin. broad. Ovary ovoid, 2–2½ lin. long.

Lower Guinea. Angola: near Mudeng, *Buchner*, 588! by the River Quango *Teusez*, 516.

4. **C. Camporum,** *Engl. in Engl. Jahrb.* xviii. 73. Stems ascending, often about 1 ft. long, sparingly branched, densely and shortly pilose, leafy; branches erect-spreading, sometimes supra-axillary, 4–8 in. long; internodes 1¼–2 in. long. Leaves usually opposite or subopposite, sessile or very shortly petiolate, lanceolate to oblong-lanceolate, 1–3½ (often 1½–2) in. long, ⅓–1 in. broad, serrulate or crenate-serrate, acute,

narrowed to the base, shortly pilose chiefly on the midrib and veins beneath, often scabrid on both sides. Flowers usually opposite, supra-axillary (often inserted 2–3 lin. above the axils of the leaves.) Pedicels 3–7 lin. long; bracteoles linear, 2–2¼ lin. long. Calyx tubular, ½–⅔ in. long, 1¾–2 lin. broad in flower, campanulate, 3½–5 lin. broad in fruit, 10-ribbed, hispidly pubescent; lobes ovate, broadly lanceolate or broadly oblong, 1–3¼ lin. long, 1–1¾ lin. broad, acute or sometimes obtuse. Corolla white or pale yellow; tube 1½–1¾ in. long, densely glandular-pilose, slightly gibbous about ½ in. from the limb; limb ¾–1½ in. long, 1–1⅓ in. broad; upper lip 4½–8 lin. long, 6–11 lin. broad, emarginate; lobes of the lower lip suborbicular-obovate, 5–7 lin. long, 4–7 lin. broad. Filaments bearded; anthers narrowly oblong, 1¾ lin. long. Style 7 lin. long, thickened in the upper part. Fruit broadly oblong, 4½–5 lin. long, 3–3½ lin. broad, obtuse, indehiscent?—Engl. in Schlechter, Westafr. Kautsch.-Exped. 314; Durand & Schinz, Études Fl. Congo, i. 213.

Upper Guinea. French Guinea: Erimakuna, *Scott-Elliot*, 5729! Togo: Misahöhe, *Baumann!* Bismarckburg, *Kling*, 181, *Buettner*, 344, 627; near Kewe, *Schlechter*, 12949! Gold Coast: Kpong, *Johnson*, 962! Lagos: Lagos, *Phillips*, 29! Ogbomoshaw, *Barter*, 3398! between Ado and Ischin, *Rowland!*

Nile Land. Jur: by the River Wau, *Schweinfurth*, 1615! Jur Ghattas, 1893! Niamniam: Nabambisso River, *Schweinfurth*, 3048! Uganda: Sibu, Nandi, *James!*

Lower Guinea. Lower Congo, *Smith! Laurent*, 16, 199. Angola: River Quango, *Buettner*.

South Central. Congo Free State: between Nyangwe and Kimbundu, *Pogge*, 1018.

C. Dewevrei, De Wild. & Durand in Comptes-rendus Soc. Bot. Belg., xxxviii. 129 (Lower Congo; near Tchia, Dewèvre) we have not seen, but from the description we suspect that it is only a form of *C. Camporum*. The breadth of the leaves and the length of the peduncles are greater, but *C. Camporum* varies considerably in the dimensions of its parts. *C. Dewevrei*, var. *minor*, De Wild. & Durand, l.c. 131, appears to be typical *C. Camporum*.

5. **C. brachycalyx,** *Schweinf. in Verh. Zool.-Bot. Gesell. Wien*, xviii. 681. Plant shrubby at the base, everywhere pubescent; stem herbaceous, 1 ft. high, sparingly branched, angular. Leaves subsessile, lanceolate, 2½ in. long, 1 in. broad, thin, cuneate at the base, acute or rather obtuse at the apex, coarsely serrate-dentate, pubescent-scabrid on both sides. Flowers solitary, opposite, somewhat remotely supra-axillary, equalling the leaves. Pedicels nearly ½ as long as the calyx; bracteoles linear-lanceolate, 4–5 times as long as broad, sometimes 0. Calyx campanulate, 1 in. long, greyish-pubescent especially at the base, 5-lobed almost to the middle; lobes ovate or ovate-lanceolate, acute, the 3 lower broader than the others. Corolla-tube 1–1¼ in. long, suberect, pubescent outside and at the throat inside; limb 6½–7½ lin. in diam., sparsely puberulous or glabrate inside and outside; lobes orbicular. Anthers 1½ lin. long.

Nile Land. Gallabat: by the River Gendua, *Schweinfurth*, 247.

6. **C. questieauxianum,** *De Wild. Études Fl. Katanga*, 124, *t.* 4. Stems erect, about 10 in. long, bearing some scarious bracts at the base, glabrous or furnished with small scattered hairs; internodes $\frac{3}{4}$–$1\frac{3}{4}$ in. long. Leaves opposite or subopposite, sessile or the lower with a short petiole, oblong or the upper oblong-lanceolate, $1\frac{1}{4}$–2 in. long (the middle ones longest), 2–$3\frac{1}{2}$ lin. broad, rigid, glabrous, irregularly crenate. Flowers racemose. Pedicels $\frac{1}{2}$–1 in. long; bracteoles linear about 5 lin. long and $\frac{1}{2}$ lin. broad, attached near the summit of the pedicels. Calyx tubular, $6\frac{1}{2}$–$7\frac{1}{2}$ lin. long, glabrous; lobes about 4 lin. long, narrow, acute. Corolla-tube about 1 in. long, narrow, slightly inflated towards the middle and curved, glandular-pubescent outside; lobes obovate, $7\frac{1}{2}$ lin. long, the upper about twice as broad as the others and slightly bilobed at the apex. Ovary glabrous, compressed; style shorter than the stamens, with an elongated stigma.

South Central. Congo Free State: Katanga; near Lukafu, *Verdick*, 165.

7. **C. tomentosum,** *Engl. in Ann. Istit. Bot. Roma*, vii. 29. A large herb with the stems and the underside of the leaves, especially on the nerves fulvous-tomentose; lower internodes $1\frac{3}{4}$–2 in. long; upper internodes 7–12 lin. long. Leaves oblong-elliptic, about 2 in. long, 12–13 lin. broad, subcoriaceous, acute at both ends, crenate-serrate; lateral nerves several, ascending. Flowering branches racemose, turned to one side; internodes 5–$7\frac{1}{2}$ lin. long. Pedicels $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long; bracteoles linear, about 5 lin. long and $\frac{3}{4}$ lin. broad, obtuse, tomentose, approximate to the calyx. Calyx about $1\frac{1}{4}$ in. long, shortly grey-pilose; tube about 1 in. long, subcylindric, constricted above, at length slit on one side; lobes lanceolate, $2\frac{1}{2}$ lin. long, $\frac{3}{4}$ lin. broad. Corolla white, violet when dry; tube obliquely funnel-shaped, up to $2\frac{1}{2}$ in. long, curved; lobes obovate, 1–$1\frac{1}{4}$ in. long and broad, reticulately veined.

Nile Land. Galla Country: Biddume, *Riva*, 1219.

8. **C. erectum,** *Rendle in Journ. Bot.* 1896, 128. Stem woody, erect, up to $3\frac{1}{2}$ ft. long and $2\frac{1}{4}$ lin. thick, shortly hispid, sparingly branched above, the cortex and outer layers of the wood tinged with purple; branches short. Leaves sessile, lanceolate or suboblong from a cuneate base, up to 2 in. long and 10 lin. broad, shortly hispid on both sides, crenate-serrate except at the entire base. Flowers opposite, forming a raceme up to 1 ft. long; bracts similar to the leaves but smaller, about equal in length to the pedicels. Pedicels $\frac{1}{2}$ in. long, becoming $\frac{3}{4}$ in. long in fruit, somewhat hispid; bracteoles linear-lanceolate, nearly 2 lin. long, inserted under the calyx, somewhat hispid. Calyx tubular, 7–8 lin. long, oblique above through being slit to about the middle on the lower side, equally 5-lobed; lobes narrowly triangular, acuminate, 1 lin. long. Corolla dark purple when dry; tube $1\frac{1}{4}$ in. long, 1 lin. broad in the lower half, widening to $1\frac{1}{4}$ lin. broad at the insertion of the stamens; limb delicately veined; upper lip bifid to the middle; lobes of the lower lip broadly ovate, $\frac{2}{3}$ in. long, $\frac{1}{2}$ in. broad. Style $2\frac{3}{4}$ lin. long. Capsule (unripe) broadly oblong, $\frac{1}{4}$ in. long, slightly compressed,

rounded at the apex, apiculate.—Engl. in Engl. Jahrb. xxxvi. 230. *C. fruticans*. Engl. l.c.

Nile Land. Somaliland: Sheik-Husein, *Donaldson-Smith*; between Luku and Sheik-Husein, 4600 ft., *Ellenbeck*, 1239! Galla Country; near Walengo, 4900 ft., *Ellenbeck*, 1294!

Imperfectly known species.

9. **C. Bricchettii,** *Engl. in Ann. Istit. Bot. Roma*, vii. 30. Stem thickened at the base, 7½–10 lin. thick, woody; branches 4–6 in. long, woody, much branched below, everywhere shortly and sparsely grey-pilose; internodes 7½–10 lin. long. Leaves rather thick, lanceolate, 2½–5 lin. long, 1–1½ lin. broad, entire or few-toothed. Bracts linear or linear-lanceolate. Pedicels very short; bracteoles narrowly linear, about 2½ lin. long, ¼ lin. broad. Calyx campanulate, 2¼–3 lin. long, grey-pilose; tube 1½–2 lin. long; lobes unequal, ¾–1 lin. long. Corolla-tube 5 lin. long; lobes of the upper lip shortly obovate, about 1 lin. long; lobes of the lower lip obovate-oblong, about 4½ lin. long. Capsule broadly ovoid, about 2½ lin. long, 2 lin. broad, obtuse, 2-valved.

Nile Land. Somaliland: Harar, *Robecchi-Bricchetti*.

46. **HARVEYA,** Hook.; Benth. et Hook. f. Gen. Pl. ii. 967.

Calyx campanulate or tubular-campanulate, subinflated or narrow, often oblique, shortly 5-fid or 5-lobed to below the middle. Corolla-tube elongated, usually incurved, equal or usually very much enlarged in the upper part; limb oblique or subequal; lobes 5, erect-spreading or the lateral reflexed, entire and flat or denticulate and undulate-crisped on the margin; 2 upper lobes inside, sometimes more connate than the others. Stamens 4, didynamous, included or scarcely exserted; anthers 2-celled; cells parallel or transverse, one perfect, aristate, acuminate or mucronate at the base, the other empty, longer, subulate-acuminate. Ovary 2-celled; placentas affixed to the septum, peltate, 2-fid or 2-partite; ovules very numerous in each cell. Style incurved or involute; stigma tongue-shaped, clavate or oblong. Capsule ovoid or ellipsoid, loculicidal; valves entire or scarcely 2-fid. Seeds very numerous, oblong; testa loose, reticulate, hyaline; nucellus very small. —Parasitic usually glandular-hairy herbs, often coloured in the living state, blackish when dry. Leaves opposite or alternate, mostly (especially the lower) reduced to scales. Flowers axillary or in terminal racemes or spikes, 2-bracteolate or ebracteolate, large, usually brightly coloured.

Species about 28, mostly in South Africa, with 1 in the Mascarene Islands.

Corolla large; limb more than 1 in. in diam.	
Calyx oblique; corolla-tube 2–2½ in. long; style included	1. *H. versicolor*.
Calyx equal; corolla-tube 1½–2 in. long; style exserted	2. *H. andongensis*.

Corolla smaller; limb 1 in. or less in diam.
Plant quite glabrous . . . . . 3. *H. Thonneri.*
Plant more or less glandular-pilose.
Plant 8–12 in. high . . . . . 4. *H. obtusifolia.*
Plant 3–6 in. high.
Plant nearly glabrous; stems leafless; style nearly 2 in. long . . . . . 5. *H. liebuschiana.*
Plant densely glandular-pilose; stems with several leaves or leafy bracts; style 1¼–1½ in. long . . . . . 6. *H. huillensis.*

1. **H. versicolor,** *Engl. Pfl. Ost-Afr. C.* 362. Stems simple, 6–12 in. high, rather slender, sparingly pilose, few-leaved; internodes 2–3 in. long. Leaves opposite or subopposite, lanceolate or linear-lanceolate, ½–1 in. long, 1½–2½ lin. broad, somewhat obtuse, pilose, scabrid. Flowers few, solitary in the axils of the upper leaves. Pedicels ¼–1 in. long, erect, pilose. Calyx tubular-campanulate, very oblique, ¾–1 in. long, glandular-pilose; tube ½–¾ in. long, 4–5 lin. broad at the apex; lobes triangular, 2½–4 lin. long, 1½–2½ lin. broad at the base, acuminate. Corolla-tube 2–2½ in. long, 6–6½ lin. broad at the top, yellow; limb about 1¾ in. in diam., violet; upper lip about 1 in. long and 1¼ in. broad; lobes of the lower lip suborbicular, 7–9 lin. in diam.

Mozamb. Dist. German East Africa: Msalala and Ugogo, *Hannington!* Ukome, *Stuhlmann,* 3425, 3437! Wally River, *Böhm,* 97.

2. **H. andongensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 780. A herb 10–14 in. high; stem erect, rather slender, simple or sparingly branched, more or less densely glandular-pilose, scaly at the base, nearly leafless at least on the lower half. Upper leaves few, opposite to alternate, sessile, ovate-oblong or narrowly oblong, 5–7 lin. long, suberect, acute, entire, more or less densely glandular-pilose. Flowers fœtid, solitary at the end of the stems and branches or more usually in a very lax 2–4-flowered cyme. Pedicels ¾–1½ in. long, suberect, densely glandular-pilose. Calyx cylindric or tubular-campanulate, regular, ⅔–¾ in. long, densely glandular-pilose; tube 6–7 lin. long, 3–4 lin. broad; lobes deltoid-ovate, 2–4 lin. long, 1½ lin. broad at the base, somewhat acute. Corolla-tube funnel-shaped, deep yellow with longitudinal brown stripes, glandular-pilose outside, 1½–2 in. long, 1½ lin. broad at the base, much enlarged above, 6–7 lin. broad at the apex, distinctly curved; limb spreading, 1¼–2 in. in diam., blood-red, whitish rose with 2 brown dots at the base, yellowish at the throat; lobes rounded, ⅔–1 in. in diam. Style exserted; stigma subglobose.—*H. macrantha,* Engl. & Gilg in Baum, Kunene-Samb. Exped. 369.

Lower Guinea. Angola: Pungo Andongo; Panda forests, between Quibinde and Quitage, *Welwitsch,* 5867! by the River Kulei, 4300 ft., *Baum,* 869!

3. **H. Thonneri,** *De Wild. & Durand, Pl. Thonner. Congol.* 35, *t.* 6. An erect saprophytic yellow glabrous herb, 4–8 in. high, drying blackish; internodes about 7½ lin. long. Leaves opposite, sessile, bract-like, ovate, ⅓–½ in. long, somewhat longer than the pedicels, pale yellow, more or

less acute. Flowers several, solitary in the axils of the upper leaves, opposite. Calyx tubular, about $\frac{3}{4}$ in. long and $\frac{1}{4}$ in. broad; lobes oblong, triangular, about $\frac{1}{4}$ the length of the tube. Corolla pale yellow, citron-yellow at the throat; tube funnel-shaped, oblique, about $1\frac{1}{4}$ in. long, 2 lin. broad at the base, more or less recurved and inflated at the apex where it is about $\frac{1}{2}$ in. broad; upper lobe $\frac{1}{2}$ in. broad, somewhat larger than the lower, shortly bifid. Style slightly longer than the corolla-tube; stigma capitate. Capsule ovate-elliptic.

South Central. Congo Free State: Bobi, near Gali, 1500 ft., *Thonner*, 37.

4. **H. obtusifolia,** *Vatke in Abhandl. Naturw. Ver. Bremen*, ix. 130. A more or less densely glandular-pilose herb; stems simple, erect, 8–12 in. high, $\frac{3}{4}$–2 lin. thick. Leaves opposite or subopposite; lowermost small, scale-like; upper lanceolate to oblong-lanceolate, $\frac{3}{4}$–$1\frac{3}{4}$ in. long, 1–3 lin. broad, obtuse or acute, entire. Flowers solitary in the axils of the upper leaves, opposite. Pedicels $1\frac{1}{2}$–7 lin. long, erect. Calyx tubular-campanulate, 6–10 lin. long, more or less densely glandular-pilose; tube $3\frac{1}{2}$–$5\frac{1}{2}$ lin. long, about $3\frac{1}{2}$ lin. broad; lobes lanceolate-triangular, unequal, $2\frac{1}{2}$–5 lin. long, 1–$1\frac{3}{4}$ lin. broad at the base, acute. Corolla-tube 10–15 lin. long, somewhat funnel-shaped, incurved, more or less distinctly ventricose above, $1\frac{1}{4}$–2 lin. broad at the base, 5–$5\frac{1}{2}$ lin. broad at the apex, glandular-pilose; limb $\frac{2}{3}$–1 in. in diam., spreading; lobes suborbicular, 3–5 lin. in diam. Style as long as the corolla-tube; stigma large, capitate. Capsule ovoid or ellipsoid, about $\frac{1}{2}$ in. long, beaked.—Engl. Pfl. Ost-Afr. C. 362. *Aulaya obtusifolia*, Benth. in DC. Prodr. x. 523. *Gerardia obtusifolia*, Benth. in Hook. Comp. Bot. Mag. i. 211. *Sopubia obtusifolia*, G. Don, Gen. Syst. iv. 560.

Mozamb. Dist. German East Africa: Usambara; Bumbuli, *Meinhof*, 22! Doda, *Holst*, 2952! British Central Africa: Nyasaland; Songwe and Karonga, 1700–2000 ft., *Whyte!*

Also in Madagascar.

5. **H. liebuschiana,** *Engl. MSS.* A nearly quite glabrous herb; stem simple, about $4\frac{1}{2}$ in. high, erect, leafless. Flowers several, forming a short terminal raceme. Pedicels 2–$2\frac{1}{2}$ lin. long. Calyx tubular-campanulate, oblique, 11–15 lin. long, 5–6 lin. broad at the top of the tube, very sparingly pulverulent; lobes triangular, 3–$4\frac{1}{2}$ lin. long, $1\frac{1}{2}$–3 lin. broad at the base, acute or shortly acuminate, very minutely few-toothed. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ in. long; tube funnel-shaped, curved, about $\frac{1}{6}$ in. broad near the base, $\frac{1}{2}$ in. broad at the apex; limb about 1 in. in diam.; lobes short and broad. Style nearly 2 in. long; stigma suborbicular, about $1\frac{1}{4}$ lin. in diam.

Mozamb. Dist. German East Africa: Usambara; Lutindi, *Liebusch!*

6. **H. huillensis,** *Hiern in Cat. Afr. Pl. Welw.* i. 780. An erect herb about 5 in. high, covered with glandular shaggy hairs; stems simple. Leaves opposite, sessile, oval-oblong or narrowly obovate, $\frac{2}{3}$–1 in. long, about $\frac{1}{4}$ in. broad, obtuse, narrowed at the base; lower leaves smaller, scale-like. Flowers solitary in the axils of the upper

leaves, spreading. Pedicels about $\frac{1}{6}$ in. long. Calyx tubular, somewhat inflated, nearly 1 in. long, about $\frac{1}{4}$ in. broad; lobes subequal, ovate-lanceolate, $2\frac{1}{4}$–3 lin. long. Corolla glandular-puberulous outside; tube narrowly tubular below, inflated and yellow above the calyx-tube, about $1\frac{1}{2}$ in. long; limb about $\frac{3}{4}$ in. in diam., blue; lobes obovate, about $\frac{1}{2}$ in. long. Style curved near the apex, about as long as the corolla-tube; stigma broadly obovoid.

Lower Guinea. Angola: Huilla; in Panda forests, between Bordo da Terra and Lake Ivantala, *Welwitsch*, 5840!

A specimen from Nyasaland (*Cameron*, 11) appears to be the same as the above.

Imperfectly known species.

7. **H. Buchwaldii,** *Engl. in Engl. Jahrb.* xxiii. 517. Plant snow-white, drying black; stem 4–6 in. high; internodes 5–10 lin. long. Leaves ovate, only 2–$2\frac{1}{2}$ lin. long. Bracts lanceolate, 10–12 lin. long, $2\frac{1}{2}$–3 lin. broad, obtuse. Pedicels as long as the bracts. Calyx long-tubular; tube 5 lin. long, $3\frac{1}{2}$ lin. broad; lobes oblong-triangular, $1\frac{1}{2}$ lin. long, $2\frac{1}{4}$ lin. broad. Corolla-tube obliquely funnel-shaped, about 1 in. long, $\frac{3}{4}$–1 lin. broad in the lower part, about 5 lin. broad in the upper part; upper lobes of the limb 5 lin. long, 4 lin. broad, somewhat larger than the lower. Longer stamens equalling the corolla-tube; fertile anther-cells about 2 lin. long and $\frac{1}{2}$ lin. broad; sterile cells narrow, $1\frac{1}{2}$–2 lin. long.

Mozamb. Dist. German East Africa: Usambara; in the forest of Taurota, *Buchwald*, 434.

8. **H. foliosa,** *Schweinf. ex Penzig in Atti Congr. Bot. Internaz. Genova*, 1892, 328, 352, *without description.*

Nile Land. Eritrea: Bogos to Mensa, *Penzig.*

47. **BUTTONIA,** McKen; Benth. et Hook. f. Gen. Pl. ii. 970.

Calyx campanulate, inflated in fruit; lobes 4 or 5, short, valvate. Corolla-tube funnel-shaped, broad at the top; limb oblique, spreading; lobes 5, 2 upper rather smaller than the others, lateral largest, outside in the bud. Stamens 4, didynamous, attached to the middle of the corolla-tube; filaments filiform, incurved; anthers glabrous, connivent in pairs; one cell of the shorter pair reduced to an awn; one cell of the longer pair quite obsolete. Ovary glabrous, 2-celled; ovules numerous; style filiform. glabrous, slightly overtopping the stamens, recurved. Capsule globular, included in the calyx, loculicidal. Seeds numerous, truncate; testa loose, transparent, netted.—Half-shrubby or herbaceous climbers with slender, flexible stems. Leaves opposite, pinnatisect or pinnatifid; segments small, lobed or toothed. Flowers showy.

Species 2, the other in South Africa.

1. **B. Hildebrandtii,** *Engl. Jahrb.* xxiii. 509, *t.* 11, *A—C.* A half-shrubby or herbaceous, glabrous climber. Stems slender, flexible smooth. Leaves (only the uppermost ones of flowering-branches seen) opposite, petiolate, ovate-spathulate, about an inch long, pinnatifid or 3–7-toothed. Flowers axillary, solitary in the axils of the reduced leaves or bracts. Pedicels $\frac{1}{2}$–$\frac{3}{4}$ in. long. Bracteoles 2, nearly close under the calyx, ovate or spathulate, 2–3 lin. long. Calyx inflated, about $\frac{1}{2}$ in. across and $\frac{3}{4}$ in. deep; lobes erect, triangular, acute, $1\frac{1}{2}$–2 lin. long. Corolla obliquely funnel-shaped, $1\frac{1}{2}$ in. long and across; tube inflated above the middle; lobes rounded, spreading, the two uppermost smallest. Stamens included. Style recurved, persisting long after the fall of the corolla.

Nile Land. British East Africa: Taita; by the Voi River, *Hildebrandt*, 2493.

In the Kew Herbarium there are two fragmentary specimens which probably belong to this species. One is from Kilimanjaro (*Johnston*), and the other from Kikumbuliu, in British East Africa (*Scott-Elliot*, 6364). Johnston's specimen has been named *B. natalensis*, McKen (Oliv. in Trans. Linn. Soc. ser. 2, Bot. ii. 343), but its flowers are less than half the size of those of that species.

48. THUNBERGIANTHUS, Engl. in Engl. Jahrb. xxiii. 509, t. 11, D—F. (*Thunbergiopsis*).

Calyx campanulate 5-toothed, upper and lateral teeth nearly equal, apiculate, the two lower connate into one with two points. Corolla-tube obliquely funnel-shaped, bulging behind and rough inside; limb nearly equally 5-lobed; lobes semicircular. Stamens 4, didynamous, anticous pair longer than the posticous; filaments smooth; anthers attached by their tips; cells unequal, the sterile much smaller than the fertile. Ovary seated in a shallow disk, ovoid, 2-celled; placentas thick, bearing numerous ovules; style slender, curved downwards, thickened towards the top. Capsule ovoid, 2-celled, exceeding the calyx. Seeds (linear, cuneiform, testa hyaline?).

Species 1, endemic.

1. **T. Quintasii,** *Engl. in Engl. Jahrb.* xxiii. 509, *t.* 11, *D—F.* A climbing herb with zigzag somewhat flattened stems; internodes $1\frac{1}{4}$–$2\frac{1}{2}$ in. long. Leaves opposite, petiolate; lower ones larger, cordate-ovate, $2\frac{1}{2}$–3 in. long and 2–$2\frac{1}{2}$ in. broad, unequally and coarsely 4-toothed on each side, long-acuminate, acute; upper ones ovate-lanceolate, entire; petiole $\frac{1}{3}$–1 in. long, clothed with very small prickles. Flowers axillary, solitary, pedicellate; pedicels 1–$1\frac{1}{2}$ in. long. Calyx about $\frac{1}{2}$ in. long. Corolla about $1\frac{1}{2}$ in. long and broad; lobes about $\frac{1}{2}$ in. long, lower slightly reflexed. Stamens included. Style slightly longer than the corolla-tube. Capsule exceeding the calyx.

Lower Guinea. Island of St. Thomas: Angolares, *Quintas*, 75.

There is a very imperfect specimen in the Kew Herbarium from Wimi, Uganda (*Scott-Elliot*, 7919), which apparently belongs to *Thunbergianthus*, though the calyx is nearly equally 5-lobed, and the lobes about as long as the tube.

49. **GHIKÆA,** Volkens & Schweinf. in Ghika, Pays des Somalis, 214; Liste Pl. Somalis (1897), reprint, 14.

Calyx campanulate, 5-lobed; lobes equal, lanceolate. Corolla-tube ventricose; limb oblique, nearly equally 5-lobed and obscurely 2-lipped; upper lobes overlapped by the lower in bud. Stamens 4, didynamous, included, dimorphic, all 1-celled, the upper pair shorter, on short filaments attached above the middle of the corolla; connective 2-branched, upper branch thickened at the base and bearing a large pollen-cell, lower branch produced downwards in the form of a long, slender, curved, pointed spur; lower pair of stamens on long filaments attached below the middle of the corolla; connective not produced. Ovary glabrous; style glabrous, filiform, exserted. Capsule oblong, obtuse, apiculate. Seeds unknown.

Species 1, endemic.

1. **G. spectabilis,** *Volkens & Schweinf. in Ghika, Pays des Somalis*, 214. A dwarf, much-branched, hispid shrub with very slender, somewhat tetragonous flowering-branches; older branches as much as $\frac{1}{3}$ in. in diam. Leaves alternate (only those of the upper part of a flowering branch seen), shortly stalked, thick, rigid, rough, ovate or obovate, $\frac{1}{2}$–$\frac{3}{4}$ in. long, acute or obtuse; veins immersed, obscure. Flowers violet, showy, solitary, shortly pedunculate from above the axils of the leaves with usually two discoid glands one above the other between the leaf-axil and the peduncle. Bracteoles 2, linear or filiform, close to the base of the calyx and a little more than half as long. Calyx somewhat hispid outside, especially on the margin of the lobes, 4–5 lin. long, 10-ribbed, distinctly net-veined between the ribs; lobes erect, ovate-lanceolate, acute, a little longer than the tube. Corolla $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, glabrous except on the ciliate lobes, veined; tube ventricose, slightly constricted at the top; lobes about $\frac{1}{4}$ in. long, broad, rounded, slightly recurved. Stamens included. Style slightly exserted.—Engl. in Ann. Istit. Bot. Roma, vii. (1897), 27; Jahrb. xxiii. 510 t. 13, fig. J. & K. *Graderia speciosa*, Rendle in Journ. Bot. 1896, 128, and 1901, 316.

Nile Land. Somaliland: Lower Sheikh, 3000 ft., *Thomson*, 61! Darar and Sheikh Husein, *Donaldson-Smith!* and without precise locality, *Appleton!*

We have not seen the variety *denticulata*, Engl. in Ann. Istit. Bot. Roma. vii. 28, which is described as being a slender herb, having lanceolate leaves furnished with very minute spreading teeth.

50. **PSEUDOSOPUBIA,** Engl. in Ann. Istit. Bot. Roma, vii. (1897), 28; Engl. Jahrb. xxiii. 511, t. 13, fig. L—Q.

Calyx campanulate, 5-lobed; lobes equal or nearly so. Corolla-tube suddenly inflated above the base; limb oblique, 2-lipped; upper lip over-lapped by the lower in bud; lobes all rounded. Stamens 4,

didynamous, included, dimorphic, all inserted nearly on the same level; upper pair smaller without any appendage; lower pair having a 2-branched connective; upper branch bearing a large anther-cell; lower branch shorter, curved upwards and terminating in a disk-shaped appendage; anthers all 1-celled and dehiscing by a terminal pore. Ovary 2-celled, many-ovuled. Capsule ovoid, 2-valved. Seeds numerous, rather large, angular, oblique, deeply pitted.

Species 7, endemic.

The genus is easily distinguished from all others by the peculiar structure of the stamens.

Calyx and corolla glabrous . . . . . 1. *P. Delamerei.*
Calyx and corolla hispid or softly pubescent.
  Stems flexible, prostrate or ascending.
    Stems short, unbranched; leaves less than ½ in. long . . . . . 2. *P. procumbens.*
    Stems long, branched, very slender; leaves more than ½ in. long . . . . . 3. *P. kituiensis.*
  Stems rigid, angular.
    Stems slender, irregularly, densely branched . . 4. *P. Hildebrandtii.*
    Stems dwarf, with few, opposite branches . . 5. *P. ambigua.*
    Stems 2–3 ft. high, straight, almost unbranched; leaves more than 1 in. long . . . . 6. *P. elata.*
    Stems about 2 ft. high, thick and woody below, branched above the middle; leaves less than 1 in. long . . . . . 7. *P. oblusifolia.*

1. **P. Delamerei,** *S. Moore in Journ. Bot.* 1901, 261. An erect scabrid herb, drying black. Stem somewhat tetragonous; internodes ½–¾ in. long. Leaves opposite, sessile, linear or linear-oblong, about ½ in. long, obtuse. Bracts similar to the leaves but smaller. Flowers solitary in the axils of the leaves or bracts, rather large for the genus. Pedicels 2–3 lin. long. Bracteoles 2, opposite, about 1½ lin. long, not close to the calyx as in most species. Calyx broadly campanulate, about 5 lin. long, obscurely nerved, glabrous; lobes triangular, acute, shorter than the tube. Corolla glabrous, nearly 1¼ in. long and across; tube cylindrical at the base and suddenly inflated; limb 2-lipped; upper lip emarginate, lower shortly 3-lobed; lobes all rounded and undulated. Stamens included. Anther-cells oblong, tapering upwards, dehiscing by a terminal pore; abortive cell of the lower pair and connective about 2½ lin. long. Ovary ovoid, glabrous; style included.

Nile Land. British East Africa: Dadaro, 3700 ft., *Lord Delamere!*

The only specimen we have seen of this very distinct species is in the British Museum. It differs from all the others in having glabrous flowers.

2. **P. procumbens,** *Hemsl.* A trailing, hispid, perennial herb with numerous very slender stems, 3–8 in. long; internodes mostly rather longer than the leaves, especially upwards. Leaves all opposite, rigid, hispid, sessile, the lower quite small almost scale-like, larger upwards, oblong, lanceolate-oblong or ovate-oblong, 3–5 lin. long,

scarcely acute, entire; midrib and venation very obscure. Flowers about ½ in. long, solitary, axillary on slender bibracteolate pedicels about as long as the leaves; bracteoles linear-lanceolate, acute, much shorter than the calyx. Calyx narrowly campanulate, 5-ribbed, hispid, 3–3½ lin. long, somewhat unequally 5-lobed; lobes longer than the tube, lanceolate or ovate-lanceolate, acute, upper one largest. Corolla pubescent, bilabiate, oblique; tube cylindrical and narrow at the base, ventricose above; lobes of the limb rounded. Stamens included, glabrous. Ovary and style hairy. Capsule glabrous, compressed, narrowly winged above the middle, ciliolate, enclosed in the thickened, tuberculate, persistent calyx. Seeds very numerous, irregularly cuneiform and angular, ½ lin. long, surface honey-combed and having a metallic lustre in strong light.

Nile Land. British Somaliland: Golis Range at Darra-as, 5000 ft.. *Mrs. Lort Phillips! Miss Edith Cole!*

3. **P. kituiensis,** *Engl. Jahrb.* xxiii. 511. An almost glabrous herb or undershrub, apparently of diffuse or trailing habit, with very slender, flexible, quadrangular, more or less woody stems and branches. Internodes usually about the same length as the leaves, sometimes shorter, sometimes longer. Leaves mostly opposite or nearly so, thin, very slightly scabrous, linear, ½–1 in. long, acute or obtuse, narrowed at the base. Flowers solitary a little above the axils of the leaves, usually with a small cylindrical gland between the leaf and the pedicel and a smaller hemispherical one just above the pedicel. Pedicels very slender, 4–5 lin. long. Bracteoles 2, linear, about 2 lin. long, somewhat spreading, attached a little below the calyx, persistent. Calyx very slightly scabrous, campanulate, 2½–3 lin. long, nearly equally 5-lobed; lobes ovate-lanceolate, acute, slightly keeled, about as long as the tube. Corolla slightly hairy inside, slightly hairy outside, glabrous within, oblique, 6–7 lin. long, cylindrical at the base, then suddenly inflated, nearly equally 5-lobed; lobes rounded. Stamens glabrous, included. Ovary slightly hairy; style glabrous; stigma small. Capsule not seen.—*Sopubia kituiensis,* Vatke in Linnæa, xliii. 313.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt,* 2757!

4. **P. Hildebrandtii,** *Engl. Jahrb.* xxiii. 511. A scabrous much-branched herb or undershrub, 1–2 ft. high. Branches slender, quadrangular, rough with retrorse bristles tubercled at the base. Leaves all opposite, linear-oblong, 3–10 lin. long, acute. Flowers solitary in the axils of the leaves and bracts, about ⅓ in. long. Pedicels 2 lin. long. Bracteoles 2, linear, close under the calyx and shorter than the tube. Calyx scabrous with retrorse hairs, campanulate, 2–2½ lin. long, nearly equally 5-lobed; lobes ovate, scarcely acute, somewhat shorter than the tube, hairy on both sides. Corolla oblique, 7–8 lin. in diam., hairy outside, glabrous within, inflated from the base; limb nearly equally 5-lobed, lobes rounded. Stamens included, glabrous, very similar to those of *P. obtusifolia;* anthers shorter (?) than the filaments. Ovary and lower part of the style pubescent. Style longer

than the stamens. Capsule coriaceous, pubescent, spheroidal, laterally compressed nearly twice as long as the persistent calyx, 3–4 lin. long and broad, 2-valved. Seeds numerous, variable in shape, about ½ lin. long, punctate.—*Sopubia Hildebrandtii*, Vatke in Linnæa, xliii. 314.

Nile Land. British East Africa: Mount Gadu, *Kässner*, 410! Duruma, *Hildebrandt*, 2314b!

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith*, 2! Muoa, *Holst*, 2988!

See remarks under *P. ambigua*, Hemsl.

5. **P. ambigua,** *Hemsl.* A rhizomatous (?) herb throwing up adventitious (?) stems at distant intervals. Stems square, slender, 6–9 in. high, with a few opposite branches, hispid, with short, retrorse bristles. Leaves all opposite, linear-lanceolate, the largest scarcely 1 in. long, mostly much smaller, shorter than the internodes, acute, narrowed downwards, rather thick, densely clothed with short, tubercled bristles, entire; veins obsolete. Flowers solitary in the axils of the leaves, about ½ in. long. Pedicels slender, lower ones shorter than the floral-leaves or bracts, the upper longer. Bracteoles subulate, close under the calyx, scarcely a line long. Calyx hispid, campanulate, rubescent, about 2½ lin. long, 10-nerved, equally 5-lobed; lobes broadly deltoid apiculate, hairy on both sides, rather shorter than the tube. Corolla about ¾ in. across, hairy outside, inflated from the base; limb nearly equally 5-lobed; lobes rounded, slightly hairy inside near the tips. Anthers longer (?) than the filaments.

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith*, 1!

We at first took this to be *P. Hildebrandtii*, Engler, and it may be an abnormal condition of that species, of which we have seen no specimen with roots. *P. ambigua* has an underground stem or rhizome, from which rise a number of short, erect stems from adventitious buds. It is much less branched; has larger leaves, slenderer pedicels and a rubescent calyx with apiculate lobes.

Possibly the only specimen we have is of abnormal growth.

6. **P. elata,** *Hemsl.* An erect hispid herb or shrub. Stems few, erect, rigid, simple or with few erect branches 2–3 ft. high, 4-angled, rough with retrorse bristles. Leaves all opposite or nearly so, distinctly petiolate, rather thin, but rough with tuberculate hairs, linear-lanceolate or linear-oblong, 1–1¾ in. long, smaller upwards, obtuse with an apiculate tip or the upper ones acutely acuminate. Flowers solitary in the axils of the leaves and bracts, 7–9 lin. long. Pedicels 2½–3 lin. long. Bracteoles 2, linear or almost filiform, shorter than the calyx and close to its base. Calyx hispid with retrorse hairs, campanulate, 2½–3 lin. long, nearly equally 5-lobed; lobes broadly ovate, somewhat acute, the two lower a little larger than the others and apparently recurved. Corolla (a perfect one not seen) 7–8 lin. long, very hairy outside, glabrous within, distinctly veined, cylindrical at the base then suddenly inflated; limb oblique, nearly equally 5-lobed; lobes rounded. Stamens included, glabrous, very similar to those of *P. obtusifolia*. Ovary and lower part of slender style, pubescent. Ovules numerous.

Nile Land. British East Africa: Witu, *Thomas*, 9!

This species is characterised by having tall, straight, almost unbranched stems. Possibly this and our *P. ambigua* may eventually have to be reduced to *P. Hildebrandtii*, Engl., but it seems preferable to keep them apart at present rather than risk confusing several species under one name.

7. **P. obtusifolia,** *Engl. in Ann. Istit. Bot. Roma*, vii. (1897), 28. An erect, branching, slightly hispid herb about 2 ft. high; branches suberect, quadrangular, rigid, pubescent; internodes of the flower-bearing branches shorter than the leaves or bracts. Leaves and bracts opposite, shortly petiolate, rather thick, ovate or ovate-lanceolate, 5–7 lin. long, and gradually smaller upwards, obtuse or subacute, slightly hispid; venation very obscure. Flowers solitary in the axils of the leaves or bracts on very short, slender, bibracteolate pedicels, about $\frac{3}{4}$ in. long and as much across the top. Bracteoles linear or almost filiform, about as long as the calyx-tube. Calyx campanulate, $2\frac{1}{2}$–3 lin. long, hispid at first, 10-ribbed, alternate, shorter ones obscure; lobes ovate-lanceolate, a little shorter than the tube, acute, slightly recurved. Corolla hairy outside, glabrous within, veined, cylindrical at the base, then suddenly inflated; limb oblique; upper lip emarginate; lower lip distinctly 3-lobed, lobes rounded. Stamens included, glabrous; filaments filiform; anthers of the lower pair smaller. Ovary and lower part of the style clothed with long straight hairs; style very slender, longer than the stamens.—Engl. Jahrb. xxiii. 511, t. 13, fig. L—O.

Nile Land. Somaliland: between the Karaule and Daua Rivers, *Riva*, 950; Lake Rudolph, *Wellby!*

Although Capt. Wellby's specimen does not agree in some small details with Engler's description, there is, we believe, no doubt about its being the same species. Why the specific name, *obtusifolia*, was selected is unintelligible because the author describes and figures the leaves as acute.

51. **SOPUBIA,** Buch.-Ham.; Benth. et Hook. f. Gen. Pl. ii. 970.

Calyx campanulate, 5-toothed or shortly 5-lobed; lobes valvate, often deltoid or linear-triangular. Corolla-tube usually short, sometimes exserted, enlarged at the throat; limb spreading; lobes 5, broad, entire, subequal, the 2 upper inside. Stamens 4, didynamous, subincluded; anthers all coherent or coherent in pairs, 2-celled; one cell of each anther perfect, ovoid or ellipsoid, often somewhat apiculate, the other cell much smaller, linear or clavate, stipitate, quite empty or nearly empty. Style elongated, thickened or flattened at the apex. Ovules numerous in each cell. Capsule ovoid, ellipsoid or subglobose, often somewhat compressed above, retuse, emarginate or rounded at the apex, loculicidal; valves entire or at length 2-fid. Seeds numerous, oblong or obovoid or sometimes linear, obtuse or truncate; testa rather loose.—Annual herbs or undershrubs, usually erect and branched, glabrous, scabrid, white-tomentose or woolly, often drying blackish. Leaves opposite or verticillate or the upper alternate, often linear, entire or pinnatifid, with linear or filiform segments. Flowers in

terminal racemes or spikes, bracteate; pedicels 2-bracteolate near the apex.—*Gerdaria*, Presl, Bot. Bemerk. 91, without description. *Raphidophyllum*, Hochst. in Flora, 1841, 666. *Rhaphidophyllum*, Benth. in DC. Prodr. x. 521.

Species 27, mostly in Tropical Africa; a few in South Africa, Madagascar and India, one extending to China, the Malay Archipelago and Australia.

* Flowers in racemes or elongated spikes, rarely in short dense spikes when the plant is densely tomentose or woolly.

† Leaves, at least some of them, pinnatifid.

Calyx nearly glabrous outside or sometimes scabrid, not woolly.

Calyx nearly glabrous outside, $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long; pedicels 3–9 lin. long.

Stem simple or sparingly branched; leaves when divided usually with 3 segments; corolla $4\frac{1}{2}$–6 lin. in diam. . . . 1. *S. trifida.*

Stem very much branched; leaves usually with more than 3 segments; corolla 4 lin. in diam. . . . . 2. *S. Eminii.*

Calyx scabrid outside, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long; pedicels 1–$1\frac{1}{2}$ lin. long . . . . . 3. *S. similis.*

Calyx more or less woolly.

Flowers distinctly pediceliate; calyx sparingly woolly . . . . . 4. *S. karaguensis.*

Flowers sessile; calyx densely woolly . . 5. *S. Welwitschii.*

†† Leaves all entire or sometimes minutely denticulate (*S. Eenii*).

‡ Plant glabrous, shortly hairy or scabrid (stem densely pilose in *S. latifolia*), not tomentose or woolly.

Leaves ovate, $\frac{1}{2}$ in. broad, obtuse . . . 6. *S. latifolia.*

Leaves filiform to linear-lanceolate, up to $1\frac{3}{4}$ lin. broad, acute.

Corolla 1 in. in diam.; plant robust, up to $3\frac{1}{4}$ ft. high; pedicels $7\frac{1}{2}$–10 lin. long . 10. *S. Buchneri.*

Corolla 5–7 lin. in diam.; plant robust, up to 4 ft. high; pedicels $\frac{3}{4}$–2 lin. long . 7. *S. ramosa.*

Corolla 6–8 lin. in diam.; plant rather slender, 1–2 ft. high; pedicels usually 3–6 lin. long.

Leaves densely crowded; racemes densely flowered . . . . . 8. *S. Mannii.*

Leaves not crowded; racemes not densely flowered.

Calyx $1\frac{3}{4}$–$2\frac{1}{4}$ lin. long; corolla 6–8 lin. in diam.

Stems sharply angled; leaves closely adpressed; seeds $\frac{2}{3}$–$\frac{3}{4}$ lin. long 9. *S. simplex.*

Stems not sharply angled; leaves spreading; seeds $\frac{1}{4}$ lin. long . 11. *S. dregeana.*

Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; corolla 4–$4\frac{1}{2}$ lin. in diam. . . . . 12. *S. parviflora.*

‡‡ Plant tomentose or woolly.
Calyx-teeth deltoid, acute.
Leaves lanceolate or elliptic-linear, floral ones only 3–5 lin. long, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. broad . . . . . 13. *S. argentea.*
Leaves narrowly linear, floral ones 6–12 lin. long, $\frac{1}{4}$–$\frac{3}{4}$ lin. broad . . . . 14. *S. angolensis.*
Calyx-teeth oblong or ovate-oblong, very obtuse.
Leaves linear-lanceolate; calyx $2\frac{3}{4}$ lin. long; teeth oblong, 1 lin. long . . 15. S. *Eenii.*
Leaves narrowly linear; calyx scarcely $1\frac{1}{4}$ lin. long; teeth ovate-oblong, scarcely $\frac{3}{4}$ lin. long . . . . 16. *S. leprosa.*
Calyx-teeth linear or linear-triangular.
Flowers distinctly pedicellate, not crowded (western species),
Calyx-teeth $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long; corolla 7–8 lin. in diam.; style $5\frac{1}{4}$-$5\frac{3}{4}$ lin. long . . . . . 17. *S. lanata.*
Calyx-teeth $1\frac{1}{2}$ lin. long; corolla $4\frac{1}{2}$–5 lin. in diam.; style $3\frac{1}{4}$ lin. long . . 18. *S. Monteiroi.*
Flowers sessile or subsessile, crowded (eastern species).
Flowers in very dense spikes 1–3 in. long; corolla $6\frac{1}{2}$–7 lin. in diam. . 19. *S. densiflora.*
Flowers in narrower slightly interrupted spikes up to $4\frac{1}{2}$ in. long; corolla $5\frac{1}{2}$ lin. in diam. . . . . 20. *S. Carsoni.*

** Flowers in short very dense spikes; stem and leaves not densely tomentose or woolly, but merely scabrid or glabrescent.
Leaves all entire; calyx very densely woolly . 21. *S. conferta.*
Leaves usually trifid; calyx not woolly . . 22. *S. ugandensis.*

1. **S. trifida,** *Buch.-Ham. ex D. Don, Prodr. Fl. Nep.* 88. A scabrid erect more or less branched usually slender herb 1–2 ft. high; stems obscurely angled, puberulous (the hairs mostly in rows alternating with the insertions of the leaves); internodes usually $\frac{1}{2}$–1 in. long; branches erect-spreading. Leaves mostly trifid below and entire and linear above, often opposite and with very short leafy branches in their axils, $\frac{3}{4}$–1 in. long; segments narrowly linear or subulate, acute, scabrid, revolute. Flowers opposite or sometimes alternate or in whorls of 3 in loose terminal racemes. Pedicels usually $\frac{1}{4}$–$\frac{3}{4}$ in. long, slender; bracteoles narrowly linear or linear-oblanceolate, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Calyx 2–$2\frac{1}{4}$ lin. long, puberulous and scabrid outside; teeth deltoid or ovate, $\frac{2}{3}$–1 lin. long, tomentose chiefly on the margin. Corolla 3–$3\frac{1}{2}$ lin. long, $4\frac{1}{2}$–6 lin. in diam., yellow with a purple centre, or altogether purple; lobes suborbicular, $1\frac{1}{2}$–2 lin. in diam. Perfect anther-cells oblong, $\frac{3}{4}$–1 lin. long. Style about $2\frac{1}{4}$ lin. long, minutely puberulous. Capsule subglobose or shortly oblong, $1\frac{3}{4}$–2 lin. long, $1\frac{1}{2}$ lin. broad, very slightly emarginate, minutely apiculate, glabrous. Seeds $\frac{1}{4}$ lin. long, flattened, truncate at both ends.—Benth. in DC. Prodr. x. 522; Engl. in Engl.

Jahrb. xxviii. 478, and xxx. 403; Henriques in Bolet. Soc. Brot. xvi. 71; Durand & Schinz, Études Fl. Congo, i. 213; De Wild. & Durand, Contrib. Fl. Congo, i. fasc. 2, 46; Engl. in Schlechter, Westafr. Kautsch.-Exped. 313, and in Ann. Istit. Bot. Roma, vii. 27; Hiern in Dyer, Fl. Cap. iv. ii. 388; Hook. f. Fl. Brit. Ind. iv. 302. *Gerardia Sopubia*, Benth. in Hook. Comp. Bot. Mag. i. 210.

Nile Land. Somaliland: Coromma; near Burgi, *Rira*, 1335. Uganda, 4400–7000 ft.: Kavirondo; Nandi to Mumias, *Whyte!* Mau, *Scott-Elliot*, 6626! British East Africa: Lykipia, 6000–8000 ft., *Thomson!* Kikuyu, *Scott-Elliot*, 6685!

South Central. Angola: Lunda; between the Luashima (Luachim) and Chiumbue Rivers, *Marques*, 317. Congo Free State: Bolobo; Lukolela, *Büttner*; basin of the Lulua River, *Pogge*; district of the cataracts, *Laurent*; Belem, *Demeuse*; near Bonga, at the mouth of the River Sanga, *Schlechter*, 12667.

Mozamb. Dist. German East Africa: Uhehe; Uchungwe Mountains, *Goetze*, 627; Upper Kondeland; Usafua, *Goetze*, 1079. British Central Africa: Nyasaland; Nyika Plateau, 6000–7000 ft., *Whyte!*

Also in South Africa, Madagascar, India, China, Philippine Islands and Australia.

Var. *decumbens*. Skan. Stems decumbent, only 3–6 in. long.—*S. decumbens*, Hiern in Cat. Afr. Pl. Welw. i. 772, partly.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 5839 partly!

2. **S. Eminii,** *Engl. Pfl. Ost-Afr. C.* 359. An erect compact herb 1 ft. high or more, very much branched from near the base upwards; stem up to $2\frac{1}{2}$ lin. thick at the base, tapering upwards, terete below, obscurely quadrangular above, sparingly and shortly pubescent; branches opposite, slender, ascending, the lower as long as or longer than the stem, leafy. Leaves opposite, pinnatisect or sometimes bipinnatisect, up to about $1\frac{1}{4}$ in. long, often with short leafy branches in their axils; segments very narrowly linear, usually 1 or 2 on each side, revolute, scabrid. Flowers very numerous, small, opposite, in loose terminal racemes up to about 4 in. long. Pedicels 3–$4\frac{1}{2}$ lin. long, very slender; bracteoles linear, $1\frac{1}{4}$ lin. long. Calyx $1\frac{3}{4}$ lin. long, glabrous except on the pilose margin of the teeth; teeth ovate, $\frac{2}{3}$ lin. long, obtuse or scarcely acute. Corolla $3\frac{1}{4}$ lin. long, 4 lin. in diam.; lobes broadly obovate, 2 lin. long, $1\frac{1}{2}$ lin. broad. Perfect anther-cell narrowly ovoid, nearly 1 lin. long. Style $2\frac{1}{2}$ lin. long. Capsule subovoid, $1\frac{1}{2}$ lin. long and broad, slightly compressed, emarginate, shortly apiculate, glabrous. Seeds $\frac{1}{4}$ lin. long, slightly curved, truncate at both ends.

Nile Land. Uganda: Kavirondo; 4th march from Mumias, *Whyte!*

Mozamb. Dist. German East Africa: Kome Island, in Lake Victoria, *Stuhlmann*, 3582; Karagwe; Bukoba, *Stuhlmann*, 3848; Ihangiro, *Stuhlmann*, 3334!

3. **S. similis,** *Skan.* Apparently a much dwarfer plant than *S. ramosa*, Schimper's specimen being only 1 ft. high with several rather slender stems arising from a short woody stock; stems shortly pilose, the hairs in lines alternating with the insertion of the leaves.

Leaves mostly in whorls of 3, usually trifid or sometimes with 4 or 5 segments; segments narrowly linear, very scabrid, acuminate. Pedicels, flowers and capsules as in *S. ramosa.*

Nile Land. Abyssinia: without precise locality, *Schimper*, 695! British East Africa or Uganda; between Kikuya and Eldama Ravine, *Whyte!*

Schimper's 1368, from the Dembea Plain, is allied to this, but it is much less hairy, and the flowers are smaller, with longer pedicels. It seems intermediate between the above and *S. trifida;* it is erroneously referred to *S. ramosa* in Engl. Hochgebirgsfl. Trop. Afr. 383.

4. **S. karaguensis,** *Oliver in Trans. Linn. Soc* xxix. 123, *t.* 87, *fig. B.* An elegant branched undershrub $\frac{3}{4}$–1 ft. high, puberulous on the stems and branches; branches ascending. Leaves mostly opposite, usually with tufts of smaller ones in their axils, pinnatisect, $\frac{1}{2}$–1 in. long, somewhat fleshy, the younger pilose; segments 3–5, narrowly linear, somewhat horny along the margins. Flowers in loose terminal racemes, 2–3 in. long. Pedicels 2–3 lin. long; bracteoles narrowly linear, 3 lin. long. Calyx $3\frac{1}{2}$–$3\frac{3}{4}$ lin. long, tomentose outside and inside; lobes 5, ovate-lanceolate, 3 lin. long, rather more than 1 lin. broad at the base, acuminate. Corolla rich pink, about 4 lin. long, 7–8 lin. in diam.; lobes suborbicular, 2–$2\frac{1}{4}$ lin. in diam. Perfect anther-cell oblong, $1\frac{3}{4}$ lin. long. Style $3\frac{1}{2}$ lin. long.—De Wild. & Durand, Études Fl. Katanga, 126; S. Moore in Journ. Linn. Soc. xxxvii. 191.

Nile Land. Uganda: Kagera Valley, near Mulema, *Bagshawe,* 298.

Mozamb. Dist. German East Africa: Karagwe; hill-top, 5500 ft., *Speke & Grant,* 411!

South Central. Congo Free State: Lukafu, *Verdick!*

5. **S. Welwitschii,** *Engl. in Engl. Jahrb.* xviii. 66. An erect rather robust herb, up to 2 ft. high; stem branched or sometimes simple, up to 2 lin. thick, long-pilose, at length more or less glabrescent, leafy. Leaves subverticillate, trifid or simple and linear, 1–2 in. long, $\frac{1}{2}$–$1\frac{1}{4}$ lin. broad, shortly pubescent, somewhat scabrid, slightly revolute; segments linear, acute, the median longer than the lateral. Flowers in an interrupted or almost uninterrupted spike up to 9 in. long. Bracteoles linear or linear-lanceolate, 2–$3\frac{1}{2}$ lin. long, acute, densely villous. Calyx $3\frac{1}{4}$–$4\frac{1}{2}$ lin. long, densely whitish villous; lobes ovate-lanceolate, $2\frac{1}{2}$–4 lin. long, 1–$1\frac{1}{3}$ lin. broad, acute or subacute. Corolla rose, crimson in the centre, $4\frac{1}{2}$–6 lin. long, 6–8 lin. in diam.; lobes suborbicular or broadly obovate, 3–5 lin. long, $2\frac{1}{2}$–5 lin. broad. Perfect anther-cell oblong, $1\frac{3}{4}$–2 lin. long. Style 4–$5\frac{1}{2}$ lin. long, very sparingly puberulous below. Capsule subglobose or ovoid, 2–$2\frac{1}{4}$ lin. long, $1\frac{1}{2}$–2 lin. broad, glabrous.—Hiern in Cat. Afr. Pl. Welw. i. 773; Engl. & Gilg in Baum, Kunene-Samb. Exped. 365.

Lower Guinea. Angola: Huilla; Serra Oiahoya, *Welwitsch,* 5841! Humpata, *Johnston!* near Manonge, 4400 ft., *Baum,* 853! by the River Cunene, *Johnston!*

Var. *micrantha,* Engl. Pfl. Ost-Afr. C. 359. Segments of the leaves narrower. Flowers smaller.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 5500–6200 ft., *Volkens*, 1997 !

6. **S. latifolia,** *Engl. in Engl. Jahrb.* xviii. 66. Stem erect, densely pilose; internodes about 10 lin. long. Leaves subverticillate or verticillate, ovate, 8–10 lin. long, 6 lin. broad, obtuse, minutely apiculate, subtruncate or subcordate at the base, scabrid on both sides. Inflorescence a raceme 1 ft. long or more; bracts similar to the leaves but smaller. Pedicels of the lower flowers $7\frac{1}{2}$–10 lin. long, with spreading hairs; bracteoles oblong or elliptic, $2\frac{1}{2}$ lin. long, $1\frac{1}{2}$ lin. broad, stalked, inserted a little below the calyx. Calyx cup-shaped, about $4\frac{1}{2}$ lin. long, densely covered with minute hairs, scabrid; teeth semi-ovate, almost $1\frac{1}{2}$ lin. long, long-pilose on the margin. Corolla large; lobes obovate, 5 lin. long and broad. Anthers 3-$3\frac{1}{2}$ lin. long. Style about 10 lin. long, much dilated at the apex. Capsule ellipsoid, about 4 lin. long and $2\frac{3}{4}$ lin. broad, slightly emarginate at the apex.

South Central. Lunda: Bashilange; Mukenge, *Pogge*, 1112 !

7. **S. ramosa,** *Hochst. in Flora*, 1844, 27. A robust erect scabrid undershrub 2–4 ft. high or sometimes more, freely branched usually above; stem and branches terete, often rather densely pubescent (the hairs mostly in 3 or 4 rows alternating with the insertions of the leaves), densely leafy; branches ascending, the lower usually longer than the upper, giving the plant a pyramidal habit. Leaves usually in whorls of 4 or 3, linear or linear-lanceolate, up to $1\frac{1}{2}$ in. long (often $\frac{3}{4}$–1 in. long), $\frac{1}{2}$–$1\frac{3}{4}$ lin. broad, acute, more or less pubescent, scabrid, revolute. Flowers usually in whorls of 4 or 3 in long terminal racemes. Pedicels $\frac{3}{4}$–2 lin. long; bracteoles linear or linear-lanceolate, $1\frac{1}{2}$–$2\frac{3}{4}$ lin. long. Calyx $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long, shortly pubescent and scabrid outside, 10-ribbed; teeth deltoid, 1–$1\frac{1}{2}$ lin. long, about 1 lin. broad at the base, acute, tomentose inside. Corolla coppery purple, rosy-purplish, rose, or white with a deep purple spot at the base of each lobe, about 5 lin. long, 5–7 lin. in diam.; lobes broadly obovate or suborbicular, $2\frac{1}{2}$–3 lin. in diam. Anther coherent; perfect cells oblong, $1\frac{3}{4}$ lin. long. Style 5 lin. long, flattened at the apex. Capsule ovoid, $2\frac{1}{2}$ lin. long, emarginate, glabrous. Seeds rather more than $\frac{1}{3}$ lin. long, flattened, truncate at both ends.—Benth. in DC. Prodr. x. 522; A. Rich. Tent. Fl. Abyss. ii. 132; Klotzsch in Peters, Reise Mossamb. Bot. 230; Oliver in Trans. Linn. Soc. xxix. 123; Hiern in Cat. Afr. Pl. Welw. i. 773; S. Moore in Journ. Linn. Soc. xxxvii. 191. *S. trifida*, var. *ramosa*, Engl. Hochgebirgsfl. Trop. Afr. 383; Engl. in Engl. Jahrb. xviii. 65; Engl. Pfl. Ost-Afr. C. 359, Engl. in Ann. Istit. Bot. Roma, vii. 27, and in Schlechter, Westafr. Kautsch.-Exped. 313; Dewèvre in Comptes-rendus Soc. Bot. Belg. xxxiii. 103. *Raphidophyllum ramosum*, Hochst. in Flora, 1841, 668.

Upper Guinea. Togo: Ala'anyo, *Krause !* Lagos: Abeokuta, *Irving*, 100 ! Northern Nigeria: Borgu, *Barter*, 774 ! Cameroons: Yaunde, *Zenker & Staudt*, 487 !

Nile Land. Abyssinia: Shireh, *Quartin-Dillon & Petit*, 206! near San Segal, *Schimper*, 507! Niamniam: Nyanye, *Schweinfurth*, 3913! Bongo: Sabbi, *Schweinfurth*, 2629! Uganda: various localities, *Wilson*, 43! *Speke & Grant*, 594! *Whyte! Bagshawe*, 240! *James! Brown*, 203! *Scott-Elliot*, 6834! 7886!

Lower Guinea. Lower Congo: Dolo, *Schlechter*, 12487! Angola: Cazengo, *Gossweiler*, 685! 1098! base of Muxaula Mountains, *Welwitsch*, 5911! Pungo Andongo; Sansamanda, *Welwitsch*, 5864! in the Præsidium near Cabondo, *Welwitsch*, 5865!

South Central. Congo Free State: Bolobo and Lukolela, *Büttner*. Lunda; by the Lulua River, *Pogge*.

Mozamb. Dist. German East Africa: Ruhigga, *Bagshawe*, 529 A! Usambara; Mshuza, *Holst*, 9124! British Central Africa: Urungu; Fwambo, *Carson! Nutt!* Nyasaland; various localities, *Buchanan*, 111! 414! 1497! 1504! *Last! Meller! Kirk! Cameron*, 19! "Zambesiland," *Kirk!*

Baum's specimen 885, collected between Kuma and Kutsi in Angola, and referred by Engler & Gilg in Baum, Kunene-Samb. Exped. 365, to this species, differs in being less branched, almost glabrous and less scabrid, leaves and flowers usually not more than 2 at a node, leaves broader, and the calyx-teeth slightly shorter and less acute. Gossweiler, 1096, from Malange, in Angola, resembles Baum's specimen, but it has longer pedicels and much broader calyx-teeth.

8. **S. Mannii,** *Skan*. An erect rigid scabrid branched herb 1–2 ft. high; stems terete, often numerous and arising from a thick woody stock, $\frac{3}{4}$–$1\frac{1}{4}$ lin. thick, puberulous, very densely leafy; internodes $2\frac{1}{2}$–3 lin. long. Leaves entire, usually in whorls of 3, most of the leaves with short densely leafy branches in their axils, narrowly linear, up to $1\frac{1}{4}$ in. long (usually 7–9 lin. long), $\frac{1}{3}$–$\frac{1}{2}$ lin. broad, somewhat keeled on the underside, acute, sparingly and shortly pubescent, scabrid especially on the margin. Flowers very numerous, usually in whorls of 3, forming terminal racemes 2–4 in. long. Pedicels 2–3 lin. long; bracteoles narrowly linear, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Calyx $2\frac{1}{4}$ lin. long, glabrous outside and on the inside of the tube; teeth narrowly deltoid, 1 lin. long, acute, tomentose inside and on the margins. Corolla 4 lin. long, about $6\frac{1}{2}$ lin. in diam., mauve-pink; lobes suborbicular, 2 lin. in diam. Anthers coherent; perfect cells oblong, $1\frac{1}{4}$ lin. long. Style $3\frac{3}{4}$ lin. long, pubescent. Capsule shortly oblong, $2\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, slightly emarginate, very shortly apiculate, glabrous. Seeds oblong, $\frac{1}{3}$ lin. long. —*S. trifida*, var. *madagascariensis*, Hook. f. in Journ. Linn. Soc. vii. 209, not of Benth.

Upper Guinea. Cameroons: Cameroon Mountain, 6000–11,000 ft., *Mann*, 1281! 2003! *Johnston*, 2!

9. **S. simplex,** *Hochst. in Flora*, 1844, 27. Apparently a perennial herb, 1–3 ft. high or more, usually with several stems arising from a woody base; stems erect, simple or branched above, often very slender, prominently angled, many-furrowed, minutely and sparingly pubescent, sparingly or very sparingly leafy; branches ascending. Leaves simple, alternate or whorled (often ternate), usually closely adpressed, narrowly linear, 2–12 (often 5–9) lin. long, revolute, scabrid on the margins and midrib below. Flowers numerous, alternate or whorled, in loose terminal racemes up to 1 ft. long. Pedicels $1\frac{1}{2}$–6 lin. long; bracteoles

linear or subulate, ¾–1 lin. long. Calyx cup-shaped, 1¾–2¼ lin. long, minutely puberulous and scabrid outside; teeth deltoid, about ¾–1 lin. long, white pilose inside and on the margins, acute. Corolla 4¼–5 lin. long, 6–8 lin. in diam., pink, rose, rose with a dark purple centre or reddish-brown; lobes obovate, 2½–3 lin. long, 2 lin. broad. Perfect anther-cell subellipsoid, 1½ lin. long. Style 3–4½ lin. long. Capsule oblong-globose or ovoid-elliptic, 2¼–2¾ lin. long, 1½–2¼ lin. broad, somewhat compressed, very slightly emarginate, shortly apiculate, glabrous. Seeds linear, falcate or somewhat clavate, ⅔–¾ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 773, and in Dyer, Fl. Cap. iv. ii. 386, partly. *S. dregeana*, Benth. in DC. Prodr. x. 522, partly. *Raphidophyllum simplex*, Hochst. in Flora, 1841, 667.

Upper Guinea. French Guinea: Erimakuna, *Scott-Elliot*, 224! Gold Coast: Afram Plains, *Johnston*, 727! Togo: Agome, *Schlechter*, 12959! Lagos: interior, *Rowland*, 129! Northern Nigeria: Nupe, *Barter!*

Nile Land. Mittu: near Kuffutukku, *Schweinfurth*, 2809! Niamniam, *Schweinfurth*, 2880! Uganda; Nandi, 6000–7000 ft., *Scott-Elliot*, 6983! Elgon District, *James!* Busoga, 3900 ft., *Dawe*, 98!

Lower Guinea. Angola: Golungo Alto; mountains of Alto Queta. *Welwitsch*, 5904! Ambaca; between Izanga and Ngombe, *Welwitsch*, 5912! Malange, *Gossweiler*, 1097!

Mozamb. Dist. Portuguese East Africa: Makua Country; Namuli, *Last!* British Central Africa: Urungu; Fwambo, *Carson*, 44! 100! Nyasaland; various localities, *Meller! Cunningham*, 5! 17! *Whyte! Scott-Elliot*, 8594! *Kirk!* Rhodesia; Matabeleland, *Bryce!*

Also in South Africa.

S. simplex was considered by Bentham, in DC. Prodr. x. 522, synonymous with *S. dregeana*, Benth. The true *S. simplex*, however, as represented by numerous specimens of which Krauss, 400, is the type, is easily distinguishable from *S. dregeana* (Drège, 4850b) by the very prominently angled many-furrowed less leafy stems, the shorter adpressed leaves, the distinctly scabrid calyx, and the very much longer seeds.

10. **S. Buchneri,** *Engl. in Engl. Jahrb.* xviii. 66. Stem up to 3¼ ft. high, simple or sparingly branched, somewhat terete, glabrescent. Leaves subverticellate (the many-leaved false whorls 1¼–1¾ in. apart), narrowly linear, 1¼–1¾ in. long, ½ lin. broad, scabrid, revolute on the margin. Pedicels in false whorls 15–10 lin. apart, 7½–10 lin. long, slender; bracteoles filiform, short, approximate to the calyx. Calyx about 2½ lin. long; teeth semi-ovate, about 1 lin. long, acute. Corolla rose, 1 in. in diam.; lobes suborbicular, spreading, the larger 5 lin. long. Perfect anther-cells 1½–2 lin. long. Style at first straight, afterwards bent downwards.

Lower Guinea. Angola: Kitamba, *Buchner*, 589! Malange, *Teusz*, 184.

11. **S. dregeana,** *Benth. in DC. Prodr.* x. 522, *partly*. Probably not specifically distinct from *S. trifida*, the chief distinguishing characters being that all the leaves in *S. dregeana* are entire; the corolla is somewhat larger and the perfect anther-cells are 1½ lin. long.—S. Moore in Journ. Bot. 1900, 468. *S. simplex*, Hiern in Cat. Afr. Pl. Welw. i.

773, partly, not of Hochst. *S. decumbens*, Hiern l.c. i. 772, partly. *Gerardia dregeana*, Hochst. in Flora, 1842, 240. *S. trifida*, forma *humilis*, Engl. in Baum, Kunene-Samb. Exped. 365. *Gerdaria dregeana*, Presl, Bot. Bemerk. 91.

Lower Guinea. Angola: Pungo Andongo; Cabinda, in Mata Lucala, *Welwitsch*, 5852! Huilla; near Lopollo, *Welwitsch*, 5839 partly! Amboella; River Kuelleis, 4600 ft., *Baum*, 233!

Mozamb. Dist. British Central Africa: Rhodesia; Leshumo Valley, *Holub*, 774! 775! 782! Mashonaland; near Umtali, *Hon. Mrs. Evelyn Cecil*, 234! Ngamiland: Okavango Valley, 3000 ft., *Lugard*, 272!

Also in South Africa.

Var. *tenuifolia*, Engl. & Gilg in Baum, Kunene-Samb. Exped. 365. Leaves filiform, up to $1\frac{1}{2}$ in. long.

Lower Guinea. Angola: Amboella; by the River Habungu, 3600 ft., *Baum*, 475!

The plant referred to in several works on the flora of Tropical Africa as *S. dregeana* is almost certainly in some cases *S. simplex*, the two species having been considered synonymous (see note under *S. simplex*). Only references to specimens which we have seen are given.

12. **S. parviflora,** *Engl. in Engl. Jahrb.* xviii. 65. An erect slender annual herb 1–$1\frac{3}{4}$ ft. high; stem somewhat quadrangular, freely branched, glabrescent or sparingly and bifariously pubescent; branches very slender, erect-spreading, bifariously pubescent or glabrescent. Leaves opposite, narrowly linear or filiform, 4–10 lin. long, revolute on the margin, scabrid chiefly on the margin. Flowers very numerous in terminal loose racemes, mostly opposite. Pedicels very slender, $2\frac{1}{2}$–4 lin. long; bracteoles narrowly linear, 1–$1\frac{1}{4}$ lin. long. Calyx $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long; tube glabrous or sparingly and shortly pubescent outside; teeth deltoid or narrowly deltoid, $\frac{1}{2}$ lin. to nearly 1 lin. long, acute or somewhat obtuse, pilose on the margin and sometimes inside. Corolla about $3\frac{1}{2}$ lin. long and 4–$4\frac{1}{2}$ lin. in diam., pale brownish, with a purple ring at the throat; lobes broadly obovate. Perfect anther-cell ellipsoid, about 1 lin. long. Style 3 lin. long. Capsule subglobose, 1–$1\frac{1}{4}$ lin. long and broad.—Hiern in Cat. Afr. Pl. Welw. i. 772.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2301!

Lower Guinea. Angola: Pungo Andongo; Sansamanda on the River Cuanza, *Welwitsch*, 5860! Lombe, *Welwitsch*, 5861!

13. **S. argentea,** *Hiern in Cat. Afr. Pl. Welw.* i. 774. An undershrub 9–18 in. high; rootstock perennial, woody, with long wiry roots; stems several, erect or ascending, simple or branched chiefly near the base, woody and glabrescent below, herbaceous and whitish silky-tomentose above, leafy. Leaves usually in whorls of 4 on the stem and alternate on the branches, sessile, lanceolate or elliptic-linear, $\frac{1}{4}$–$1\frac{1}{2}$ in. long, 1–2 lin. broad, entire, acute, narrowed at the base, densely white silky-tomentose on both sides. Flowers axillary, very numerous. Peduncles 1–4 lin. long; bracteoles linear, 2–$2\frac{1}{2}$ lin. long. Calyx $2\frac{1}{4}$–$2\frac{3}{4}$ lin. long, tomentose like the leaves outside and also on the inside of the teeth, glabrous inside the tube; teeth deltoid, nearly 1 lin. long, acute-

Corolla about $3\frac{1}{2}$ lin. long and 6 lin. in diam.; lobes suborbicular, about $1\frac{1}{2}$ lin. in diam. Perfect anther-cells ellipsoid, $1\frac{1}{4}$ lin. long. Style $2\frac{1}{4}$ lin. long. Capsule subglobose or obovoid, $1\frac{3}{4}$ lin. long, $1\frac{1}{2}$ lin. broad.

Lower Guinea. Angola: Huilla; among the Serra de Neva Mountains, in Morro de Lopollo, 5000–6000 ft., *Welwitsch*, 5845!

14. **S. angolensis,** *Engl. in Engl. Jahrb.* xviii. 67. A somewhat robust erect branched herb or undershrub about 2 ft. high, whitish silky-tomentose nearly everywhere; stem terete, about $1\frac{1}{2}$ lin. in diam. and woody at the base, branched above. Leaves mostly in false whorls of usually 4, linear, 1–$1\frac{3}{4}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, acute, entire. Flowers in loose terminal racemes, usually subopposite or in false whorls of 3 or 4. Pedicels $1\frac{1}{2}$–$4\frac{1}{2}$ lin. long; bracteoles narrowly linear, $1\frac{1}{4}$ lin. long. Calyx $2\frac{3}{4}$ lin. long, bearing inside numerous small orange-coloured excrescences, densely whitish silky-tomentose outside and on the upper part of the teeth inside; teeth deltoid, $\frac{3}{4}$ lin. long, acute. Corolla reddish purple or bluish purple, $3\frac{1}{2}$–4 lin. long, 5–6 lin. in diam.: lobes broadly obovate, 2–$2\frac{1}{2}$ lin. long, 2–$2\frac{1}{4}$ lin. broad. Anthers coherent; perfect cell ellipsoid, $1\frac{1}{4}$ lin. long. Style about 5 lin. long, pubescent below. Capsule shortly oblong, 2 lin. long, $1\frac{1}{2}$ lin. broad, densely pilose, rounded or somewhat truncate at the apex.—*S. cana*, Hiern in Cat. Afr. Pl. Welw. i. 774, not of Harvey.

Lower Guinea. Angola: Huilla; *Welwitsch*, 5843! Ivantala, *Welwitsch*, 5844!

This differs somewhat in habit from *S. cana*, Harvey, is less densely tomentose, and markedly different in its capsules, which are glabrous and emarginate at the apex in *S. cana*.

15. **S. Eenii,** *S. Moore in Journ. Bot.* 1900, 462. Plant minutely lepidote-tomentose, becoming almost glabrous; stem $\frac{3}{4}$–$1\frac{1}{2}$ lin. in diam., tetragonal, erect, branched, leafy, internodes mostly about 5–$7\frac{1}{2}$ lin. long. Leaves opposite, linear-lanceolate, $7\frac{1}{2}$–12 lin. long, $1\frac{1}{4}$–2 lin. broad, obtuse or obtusely acute, entire or more rarely minutely denticulate, membranous-coriaceous, at length almost glabrous above. Pedicels opposite or rarely ternately verticillate, $2\frac{1}{2}$–5 lin. long; bracteoles linear, acute, 1 lin. long, inserted near the middle of the pedicel. Calyx $2\frac{3}{4}$ lin. long; teeth oblong, 1 lin. long, about $\frac{1}{2}$ lin. broad, very obtuse. Corolla about 4 lin. long and 5 lin. in diam.; lobes obovate, $2\frac{1}{4}$ lin. long and scarcely as broad. Capsule oblong, 2 lin. long, emarginate. Seeds ovoid, scarcely $\frac{1}{2}$ lin. in diam.—Hiern in Dyer, Fl. Cap. iv. ii. 388.

Lower Guinea. German South-west Africa: Dammaraland, *Een!*

Also in South Africa.

16. **S. leprosa,** *S. Moore in Journ. Bot.* 1900, 468. Plant closely and minutely lepidote-tomentose on all the young parts except the flowers; stem straight, 1–$1\frac{1}{2}$ lin. in diam., subterete, branched, glabrous when mature; internodes mostly 5–$7\frac{1}{2}$ lin. long; branches ascending, densely leafy. Leaves opposite or very rarely approximate in whorls, narrowly linear, $7\frac{1}{2}$–12 lin. long, $\frac{1}{2}$–1 lin. broad, obtusely acute, quite

entire. Pedicels opposite or very rarely solitary, never verticillate, $\frac{1}{4}$–$\frac{1}{2}$ in. long, exceeding or subequalling the floral leaves; bracteoles filiform, $\frac{3}{4}$–2 lin. long, mostly inserted near the middle of the pedicel. Calyx scarcely $1\frac{1}{4}$ lin. long; teeth ovate-oblong, scarcely $\frac{3}{4}$ lin. long and broad, very obtuse. Corolla small; lobes obovate-rounded, 2 lin. long, $2\frac{1}{2}$ lin. broad. Capsule (immature) oblong, obscurely emarginate.

Mozamb. Dist. British Central Africa: Rhodesia; Salisbury, *Rand*, 158!

17. **S. lanata,** *Engl. in Engl. Jahrb.* xviii. 67. A robust erect herb or undershrub up to $1\frac{1}{2}$ ft. high or more, nearly everywhere more or less densely grey-woolly; stem woody at the base, up to 2 lin. thick, branched chiefly in the upper part, very densely leafy; branches short, nearly erect. Leaves subverticillate, linear-lanceolate or linear, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long, 1–$1\frac{1}{2}$ lin. broad, acute, slightly revolute. Flowers somewhat crowded along the uppermost parts of the stems and branches, distinctly pedicellate. Pedicels 2–5 lin. long; bracteoles linear, $4\frac{1}{2}$–$4\frac{3}{4}$ lin. long. Calyx $4\frac{1}{2}$ lin. long, densely woolly outside and on the inside of the teeth and bearing numerous small orange-yellow excrescences on the inside of the tube; teeth linear or linear-triangular, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long. Corolla rose, about 5 lin. long, 7–8 lin. in diam.; lobes broadly obovate or suborbicular, 3–$3\frac{1}{2}$ lin. long and broad. Perfect anther-cell oblong or ellipsoid, $1\frac{1}{2}$ lin. long. Style $5\frac{1}{4}$–$5\frac{3}{4}$ lin. long, sparingly pilose at the base. Capsule shortly oblong, $2\frac{1}{2}$ lin. long, about 2 lin. broad, sparingly pilose, rounded at the apex. Seeds $\frac{1}{4}$–$\frac{1}{3}$ lin. long, truncate at both ends.—Hiern in Cat. Afr. Pl. Welw. i. 774.

Lower Guinea. Angola: Pungo Andongo; banks of the Luxillo streams near Quibinda, *Welwitsch*, 5863! Pedras de Guinga, *Welwitsch*, 5856! near Malange, *Teusez*, 460.

We have not seen the specimens from British East Africa and German East Africa (Stuhlmann, 2091, Goetze, 1079), referred by Engler (Engl. Jahrb. xviii. 67, and xxx. 403) to *S. lanata*. We suspect that they belong to *S. densiflora* or *S. Carsoni*, eastern species, the material of which we found mixed up in the Kew Herbarium with *S. lanata*. This remark also applies to *S. lanata*, var. *angustifolia*, Engl. in Ann. Istit. Bot. Roma, vii. 27, from the Galla Country (Riva, 1285).

18. **S. Monteiroi,** *Skan*. A bushy plant about 2–$2\frac{1}{2}$ ft. high, very closely resembling *S. lanata*, Engl. It appears to be more slender, is much more branched, has narrower leaves and distinctly smaller flowers. Pedicels scarcely 1 lin. long; bracteoles linear, $2\frac{1}{4}$ lin. long. Calyx $2\frac{1}{2}$ lin. long, densely woolly as in *S. lanata*; teeth linear-triangular, $1\frac{1}{2}$ lin. long. Corolla pale lavender, $3\frac{1}{2}$ lin. long, $4\frac{1}{2}$–5 lin. in diam.; lobes suborbicular, about $1\frac{1}{2}$ lin. in diam. Perfect anther-cell oblong, $1\frac{1}{4}$–$1\frac{1}{3}$ lin. long. Ovary woolly. Style $3\frac{1}{4}$ lin. long, lanceolate at the apex.

Lower Guinea. Lower Congo: Bembe, *Monteiro!*

19. **S. densiflora,** *Skan*. More robust than *S. lanata*, which it closely resembles, more densely leafy, with the leaves rather shorter, and distinct in having the flowers sub-essile in dense spikes 1–3 in. long. Bracteoles linear-lanceolate, $\frac{1}{3}$ in. long. Calyx similar to that of *S. lanata*. Corolla $5\frac{1}{2}$ lin. long, $6\frac{1}{2}$–7 lin. in diam.; lobes suborbicular,

about $\frac{1}{4}$ in. in diam. Perfect anther-cells oblong, $1\frac{1}{2}$ lin. long. Style $3\frac{3}{4}$ lin. long, shortly and sparingly pubescent, broadly lanceolate at the apex. Capsule subglobose, about 2 lin. long and broad, sparingly pilose. Seeds $\frac{1}{3}$ lin. long, truncate at both ends.

Mozamb. Dist. German East Africa: Livingstone Range, east of Lake Nyasa, *Johnson !* British Central Africa: South Nyika Mountains, 4000–7000 ft., *Whyte !*

20. **S. Carsoni,** *Skan.* A robust erect undershrub up to 2 ft. high or more, branched chiefly in the upper part, densely white-woolly; stem 2–$2\frac{1}{2}$ lin. in diam. at the base, terete, very densely leafy; branches mostly short, nearly erect. Leaves entire, usually in whorls of 3, with tufts of smaller leaves in their axils, linear, $\frac{3}{4}$–$1\frac{1}{4}$ in. long, $\frac{2}{3}$–$\frac{3}{4}$ lin. broad, acute, slightly revolute. Flowers subsessile in more or less interrupted terminal spikes up to $4\frac{1}{2}$ in. long. Bracteoles linear or linear-lanceolate, 2–$2\frac{1}{2}$ lin. long. Calyx 3–$3\frac{3}{4}$ lin. long, very densely white-woolly outside and on the teeth inside, bearing numerous small orange-yellow excrescences chiefly in 10 longitudinal rows inside; teeth linear-triangular, $1\frac{1}{2}$–2 lin. long. Corolla $4\frac{1}{2}$–5 lin. long, $5\frac{1}{2}$ lin. in diam.; lobes obovate, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. long, 2–$2\frac{1}{4}$ lin. broad. Perfect anther-cell oblong, 1–$1\frac{1}{4}$ lin. long. Ovary densely woolly; style 3–$3\frac{1}{4}$ lin. long, pubescent below, narrowly lanceolate at the apex.

Mozamb. Dist. British Central Africa: Urungu; Fwambo, 5000 ft., *Carson*, 77 ! *Nutt !*

Very near *S. densiflora* and differs chiefly in having its subsessile flowers much less crowded in longer narrower spikes; its indumentum consists of whiter less adpressed hairs: the calyx is more densely woolly; the corolla is smaller; and the style is much narrower at the apex.

21. **S. conferta,** *S. Moore in Journ. Linn. Soc.* xxxvii. 191. Plant rigid, erect, up to 16 in. high; stems simple, scarcely $\frac{3}{4}$ lin. thick, furrowed, shortly grey-villous-tomentose in the furrows, soon becoming glabrous. Leaves crowded, subverticillate, narrowly linear, $7\frac{1}{2}$–10 lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad, acute, spreading, at first bearing some very slender whitish hairs, quickly glabrescent. Flowers sessile in very dense broadly oblong terminal spikes up to 2 in. long or more; bracts linear-lanceolate, about 5 lin. long and $1\frac{1}{4}$ lin. broad, densely villous-woolly on the margin. Calyx $3\frac{1}{2}$ lin. long, densely woolly; teeth triangular-deltoid, $1\frac{1}{2}$ lin. long, acute. Corolla pale crimson; tube funnel-shaped, slightly curved, $3\frac{1}{2}$ lin. long, about 1 lin. broad above; lobes ovate, shorter than the tube. Anthers coherent in pairs; perfect cells oblong, $1\frac{1}{2}$ lin. long. Capsule ovoid, $2\frac{1}{4}$ lin. long, $1\frac{1}{2}$ lin. broad, glabrous, compressed above, beaked.

Mozamb. Dist. German East Africa: Ruchigga, 6500–7000 ft., *Bagshawe*, 529 !

22. **S. ugandensis,** *S. Moore in Journ. Linn. Soc.* xxxvii. 192. Plant about 1 ft. high; stems rigid, erect, stout, simple below, branched above, subterete, $1\frac{1}{2}$–2 lin. in diam., pubescent along broad lines, otherwise glabrous; branches spreading, very densely leafy, up to 2 in. long

without inflorescence. Leaves subverticillate, sessile, trifid about as far as the middle, rarely bifid or entire, usually 5–10 lin. long, narrowly linear, somewhat obtuse, involute on the margin, scabrid; segments narrowly linear, 2½–7½ lin. long, scarcely ½ lin. broad. Flowers sessile in dense cylindric terminal spikes up to 2 in. long and 7½ lin. broad; bracts dilated and concave below, trifid above, the uppermost entire, about 5 lin. long, 2¼ lin. broad below; segments linear, 3½ lin. long, ½ lin. broad; bracteoles ovate-spathulate, 3 lin. long, obtuse, with a claw ½ lin. broad and a blade 1½ lin. broad. Calyx 4½ lin. long; teeth ovate-lanceolate, acuminate, 2½ lin. long, ciliate. Corolla red; tube 3 lin. long, slightly and gradually dilated upwards; lobes very broadly obovate, 2 lin. long. Anthers soon becoming free; perfect cells 1 lin. long. Capsule ovoid, scarcely 2½ lin. long, 2 lin. broad, somewhat compressed at the apex, retuse; valves entire. Seeds oblong or narrowly ovoid, truncate, minutely scrobiculate, fuscous.

Mozamb. Dist. German East Africa: Mpororo; below Ruchigga, *Bagshawe*, 502!

Imperfectly known species.

23. **S. Candei,** *Terracciano in Bull. Soc. Bot. Ital.* 1892, 424. Leaves simple or 3-partite, very long, rush-like, apiculate. Peduncles geniculate and 2-bracteolate at the middle. Calyx-teeth obovate, hyaline at the margin. Corolla 3 times longer than the calyx-teeth [or calyx?].

Nile Land. Somaliland: Gerar-Amaden, *Candeo.*

52. **BAUMIA,** Engl. & Gilg in Baum, Kunene-Samb. Exped. 365, t. 9.

Calyx narrow-campanulate, slightly constricted at the top of the tube, about ⅓ in. long; tube strongly 10-ribbed; lobes 5, nearly equal, short, triangular. Corolla-tube cylindrical, not exceeding the calyx; limb about ⅓ in. across, nearly equally 5-lobed; lobes rounded, reflexed. Stamens 4, nearly equal, very shortly exserted; filaments filiform; anthers glabrous, free, one cell perfect, opening longitudinally, the other much reduced, club-shaped. Ovary glabrous, 2-celled; ovules numerous in each cell; style glabrous, slightly overtopping the stamens, thickened towards the tip, curved downwards, with a line of hairs on the under-side of the curve. Capsule orbicular, compressed, enclosed in the calyx. Seeds unknown.

Species 1, endemic.

There is little, if anything, beyond the free anthers to separate this from *Sopubia.*

1. **B. angolensis,** *Engl. & Gilg, l.c.* 366. An erect slender hispid annual herb, 9–12 in. high. Stem simple or slightly branched above the middle. Leaves opposite, 1–2 in. long, deeply pinnatifid; lobes 3–7, linear, costate. Flowers subsessile, solitary in the axils of the upper leaves, and in short, terminal spikes, about ½ in. long. Bracteoles 2,

lanceolate, costate, equalling the calyx, somewhat obtuse. Calyx coarsely hairy outside, glabrous within ; lobes about a quarter the length of the tube. Corolla-limb about $\frac{1}{3}$ in. across.

Lower Guinea. Angola : by the River Onschingue, not far from the River Kuito, 4000 ft., *Baum*, 785 !

53. **MICRARGERIA,** Benth. ; Benth. et Hook. f. Gen. Pl. ii. 971.

Calyx campanulate, shortly 5-toothed ; teeth semi-ovate or narrowly deltoid, obtuse or acute. Corolla-tube exserted, enlarged above, often incurved ; limb slightly two-lipped, spreading ; lobes 5, entire, subequal, the two upper inside. Stamens 4, slightly didynamous, included ; anthers free, 2-celled ; cells distinct, parallel or slightly arched, affixed at the apex, obtuse or apiculate at the base, both fertile, nearly quite equal or 1 cell of each anther, especially of the lower stamens, distinctly shorter than the other. Style slightly thickened at the apex, elongated, obtuse ; ovules numerous. Capsule globose or subglobose, loculicidal and septicidal ; valves 2 or 4. Seeds numerous, small, oblong-cuneate ; testa rather loose.—Slender rigid erect often scabrid branched herbs, drying blackish. Lower leaves opposite or sometimes all alternate, linear, entire, or trifid. Flowers small, in the axils of the upper leaves or in terminal racemes, 2-bracteolate.—*Gerardianella,* Klotzsch in Peters, Reise Mossamb. Bot. 229, t. 36.

Species 4, 1 in India and 1 in the Mascarene Islands.

Plant puberulous, scabrid ; capsule $1\frac{1}{4}$–$1\frac{3}{4}$ lin. in diam.	1. *M. scopiformis.*
Plant glabrous, smooth ; capsule 2–$2\frac{1}{4}$ lin. in diam.	2. *M. Barteri.*

1. **M. scopiformis,** *Engl. Pfl. Ost-Afr. C.* 359. A slender rigid erect annual herb 1–$2\frac{1}{2}$ feet high, minutely puberulous and very scabrid on all the green parts ; stem subtetragonal, usually simple below, very much branched above ; branches erect-spreading, very slender, up to 1 ft. long or more. Leaves opposite, narrowly linear or filiform, $\frac{1}{4}$–2 in. long, erect or erect-spreading. Flowers nearly always opposite in loose terminal racemes $1\frac{1}{2}$–6 in. long. Bracts similar to the leaves but smaller. Pedicels $\frac{3}{4}$–4 lin. long ; bracteoles narrowly linear or subulate, $\frac{2}{3}$–2 lin. long. Calyx campanulate, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 10-nerved ; teeth deltoid or ovate, $\frac{1}{2}$–1 lin. long, acute. Corolla pale purple or whitish-rosy, purple-striate near the base of the tube, 4–5 lin. long and about the same in diam. at the base, campanulate, contracted at the base into a short tube, densely pubescent outside ; lobes suborbicular, $\frac{3}{4}$–$1\frac{1}{2}$ lin. in diam., obtuse or acute. Anthers quite distinct, 2-celled, with both cells fertile ; cells subequal or usually one (especially in the lower anthers) distinctly larger than the other ; larger cell $\frac{4}{5}$–$1\frac{1}{5}$ lin. long ; smaller cell $\frac{1}{3}$–$\frac{3}{4}$ lin. long. Style $1\frac{1}{2}$–3 lin. long. Capsule subglobose, slightly compressed, $1\frac{1}{4}$–$1\frac{3}{4}$ lin. in diam., usually quite glabrous.—Engl. & Gilg in Baum, Kunene-Samb. Exped. 365. *Gerardianella scopiformis,* Klotzsch in Peters, Reise Mossamb. Bot. 229, t. 36. *Sopubia*

scopiformis, Vatke in Linnæa, xliii. 313. *S. filiformis*, G. Don, Gen. Syst. iv. 560. *S. filiformis*, Hiern in Cat. Afr. Pl. Welw. i. 772. *Gerardia filimormis*, Schumach. & Thonn. Beskr. Guin. Pl. 272.

Upper Guinea. Gold Coast: near Ningo and Prampram, *Thonning*. Shai Plains, *Johnson*, 576! Togo: near Lome, *Warnecke*, 271!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2294! Bongo: Sabbi River, *Schweinfurth*, 2736! between Mombasa and Lamu, *Whyte!*

Lower Guinea. Angola: Huilla; Morro de Monino, *Welwitsch*, 5830! near Lopollo, *Welwitsch*, 5831! near Manonge on the River Knebe, about 4500 ft., *Baum*, 851.

Mozamb. Dist. German East Africa: Usambara; Duga, *Holst*, 3191! lower plateau, north of Lake Nyasa, *Thomson!* Portuguese East Africa: Querimba (Kerimba) Islands, *Peters*. British Central Africa: Nyasaland; Kondowe to Karonga, 2000–6000 ft., *Whyte!* Manganja Hills, 4000 ft., *Kirk!*

Thomson's specimen from the north of Lake Nyasa has a densely puberulous capsule.

2. **M. Barteri,** *Skan*. In every respect the same as *M. scopiformis*, except that all the green parts are glabrous and smooth instead of minutely puberulous and scabrid, and the capsule slightly larger (2–2¼ lin. in diam.).

Upper Guinea. Northern Nigeria: Nupe, in wet places, *Barter*, 755! 1706!

54. **BARTSIA,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 977.

Calyx tubular or campanulate, usually 4-lobed, some of the lobes sometimes again divided or toothed. Corolla-tube slender and cylindrical with a distinctly 2-lipped limb, or ventricose with an almost equally 5-lobed limb; when 2-lipped, the upper lip helmet-shaped enclosing the stamens, the lower lip 3-lobed, spreading; corolla almost personate in one species. Stamens 4, didynamous, included; anther-cells 2, equal, parallel, usually bearded and mucronate. Style entire, capitate or tongue-shaped, included or slightly exserted. Capsule globose, ovoid or oblong and compressed, usually exceeding the calyx, septicidal; valves often splitting to the middle; placenta thick or thin. Seeds numerous, oblong or reniform, longitudinally ribbed or winged. —Herbs, usually erect, annual or perennial, sometimes shrubby, usually hispid or viscous. Leaves opposite, crenate, serrate, pinnatifid or entire, gradually smaller upwards. Flowers solitary in the axils, sessile or shortly pedicellate, ebracteolate, lower often distant, upper densely clustered.

Species about 60, inhabiting Europe, extra-tropical Asia, North Africa, and mountains of Tropical Africa and America. Two or three species are widely dispersed as colonists.

Annual. Corolla almost personate; lower lip unequally 3-lobed; palate inflated in two ridges; seeds relatively small, longitudinally ribbed or striate . . 1. *B. Trixago*.

Perennials. Corolla various; seeds longitudinally winged.

Herbs. Corolla cylindrical below, then abruptly ventricose, nearly equally 5-lobed.

Corolla abruptly curved; stems simple or with a few loose branches . . . . . 2. *B. Mannii.*

Corolla not abruptly curved; stems relatively stout; leaves more than 1 in. long . . 3. *B. abyssinica.*

Stems slender; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long . . . 4. *B. petitiana.*

Undershrubs. Corolla long, cylindrical throughout; limb distinctly 2-lipped.

Corolla-tube straight or nearly so.

Calyx-lobes shorter than the tube, rounded . 5. *B. longiflora.*

Calyx-lobes as long the tube, almost acute . 6. *B. similis.*

Corolla-tube distinctly curved.

Relat vely slender; leaves $\frac{1}{4}$–$\frac{1}{2}$ in. long . . 7. *B. kilimandscharica.*

Larger in all parts; leaves $\frac{1}{2}$–1 in. long . . 8. *B decurva.*

1. **B. Trixago,** *Linn. Sp. Pl. ed.* i. 602. Annual, somewhat hispid, 6–18 in. high. Stems simple or slightly branched in the inflorescence. Leaves sessile, thick but not rigid, spreading, narrow-lanceolate, 1–$2\frac{1}{2}$ in. long, distantly and coarsely toothed or shallowly pinnatifid; teeth and tip obtuse; primary veins 4 or 5 on each side, terminating in the sinuses between the teeth. Inflorescence terminal, usually unbranched, very dense, usually 2–3 but ranging from 1–5 in. long; floral leaves or bracts nearly as long as the flowers. Flowers sessile, yellow, 6–8 lin. across. Calyx 3–4 lin. long, densely tomentose, thick; lobes slightly unequal, very obtuse or rounded, shorter than the tube. Corolla 6–7 lin. long; tube slightly exceeding the calyx; upper lip galeate, enclosing the slightly bearded anthers; lower lip broad, unequally three-lobed, middle lobe smallest, spreading; palate longitudinally bigibbous. Filaments glabrous, dilated downwards. Ovary hirsute; style puberulous. Seeds very small, reniform, longitudinally ribbed.—Sibth. & Smith, Fl. Græca, vi. 68, t. 585. *Buchnera africana*, Linn. Pl. Rar. Afr. 13; Amœn. Acad. vi. 89. *Bellardia Trixago*, All. Fl. Pedem. i. 61; Hiern in Dyer, Fl. Cap. iv. ii. 419. *Trixago apula*, Stev. in Mém. Soc. Nat. Mosc. vi. 4; A. Rich. Tent. Fl. Abyss. ii. 134. *Bartsia rhinanthoides*, Hochst. ex Benth. in DC. Prodr. x. 543.

Nile Land. Abyssinia: various localities, *Schimper*, 839! 981! 1207! *Steudner*, 791!

Also in the Mediterranean region and South Africa and colonised in several other countries. We think it probable that it was originally introduced into South Africa, inasmuch as we have seen no specimens from the country between that and Abyssinia.

2. **B. Mannii,** *Hemsl.* Perennial, very rigidly hispid, 2–3 ft. high. Stems simple or branches few, spreading, at length woody; internodes nearly as long as the leaves. Leaves shortly but distinctly stalked, thick, rigid, spreading, narrowly lanceolate, $\frac{1}{2}$–$1\frac{1}{4}$ in. long, floral gradually smaller, obtuse, base rounded; venation strong, with about four primary veins on each side; margin broadly crenate.

Flowers about ½ in. in diam., solitary in the axils of the reduced leaves, pairs not overlapping each other, often distant; peduncles shorter than the calyx, without bracteoles. Calyx about 3 lin. long, distinctly ribbed; lobes nearly equal, longer than the tube, ovate-oblong, obtuse, thickened at the margin and with or without one or more crenatures. Corolla pubescent outside, very obliquely campanulate, longitudinally veined; tube shorter than the limb, abruptly curved at the top; limb almost equally 5-lobed; lobes broad, rounded. Anthers bearded. Capsule oblong, about ½ in. long, hairy, truncate. Seeds very numerous, oblong, longitudinally 7-winged on the back; wings broad, conspicuously transversely ribbed.—*Bartsia abyssinica*, Hook. f. in Journ. Linn. Soc. vii. 209, scarcely of Hochst. ex Benth. in DC. Prodr. x. 545.

Upper Guinea. Cameroons: Cameroon Mountain, 7000–9000 ft., *Mann*, 1264! 1986!

Although evidently closely allied, we are of opinion that the Cameroons plant is specifically different from the Abyssinian.

3. **B. abyssinica,** *Hochst. ex Benth. in DC. Prodr.* x. 545. Perennial, very hispid, 1–2½ ft. high. Stems densely branched in the inflorescence; branches suberect; internodes very short. Leaves subsessile, thick, rigid, spreading, crowded, oblong-lanceolate or ovate-lanceolate, 1–1¾ in. long, largest ½ in. broad, obtuse, base rounded, crenatures numerous. Flowers about ½ in. in diam., densely crowded. Calyx-lobes unequal, anterior longer with two or three crenatures, shorter than the tube. Corolla pubescent outside; tube less abruptly curved than in *B. Mannii* and lobes more strongly veined. Anthers bearded. Capsule ovoid, pubescent, about ½ in. long. Seeds longitudinally winged; wings with faint transverse ribs.—*Alectra abyssinica*, A. Rich. Tent. Fl. Abyss. ii. 118; Schweinf. Beitr. Fl. Aethiop. 98.

Nile Land. Abyssinia: Mount Scholoda, *Schimper*, 356! 1531!

4. **B. petitiana,** *Hemsl.* Perennial, hispid, slender, 6–18 in. high, but usually less than a foot. Stems simple. Leaves sessile, rigid, oblong, oblong-lanceolate or ovate-lanceolate, ¼–½ in. long, ascending, obtuse, rounded or cordate at the base, and usually with 5–7 crenatures on each side. Flowers about ½ in. in diam., pairs overlapping; pedicels shorter than the calyx. Calyx-lobes nearly equal, about as long as the tube, entire, broad, rounded. Corolla pubescent, less oblique than in *B. Mannii;* tube relatively longer and less abruptly curved at the top; lobes rounded, nearly equal. Capsule 4–5 lin. long, hairy. Seeds broadly winged.—*Alectra petitiana*, A. Rich. Tent. Fl. Abyss. ii. 118.

Nile Land. Abyssinia: Wojerat, *Petit*, 216! Ankober, *Roth*, 460! and without precise locality, *Schimper*, 719!

Mozamb. Dist. Kilimanjaro: above Mamba, *Volkens*, 780! British Central Africa: Nyasaland; Nyika Plateau at 7500 ft., *McClounie*, 60!

There is a specimen at Kew from the Cameroon Mountain, at 8000 ft. (Johnston), which may be this species. Engler (Hochgebirgsfl. Trop. Afr. 384) unites *B. petitiana* with *B. abyssinica*.

5. **B. longiflora,** *Hochst. ex Benth. in DC. Prodr.* x. 545. Shrubby, 1½–3 ft. high, glandular-hairy and villous. Stems rigid, sometimes much-branched. Leaves longer than the internodes, subsessile, oblong or the upper ovate-lanceolate, mostly ¾–1½ in. long, crenate, flat. Flowers shortly stalked, 1¼–1½ in. long. Calyx densely clothed with coarse hairs, glandular, 6- or 7-lobed; lobes shorter than the tube, very obtuse or rounded, upper one sometimes trifid. Corolla slightly hairy, about 1 in. long; tube straight; upper lip galeate, erect, enclosing the stamens; lower lip about ¾ in. across, nearly equally 3-lobed; lobes spathulate-rotundate, undulate. Anthers cordate, bearded. Ovary hairy; style glabrous, slightly exserted. Capsule a little longer than the calyx.—A. Rich. Tent. Fl. Abyss. ii. 134; Engl. Hochgebirgsfl. Trop. Afr. 384.

Nile Land. Abyssinia: Mount Koubi, *Schimper,* 418! Wojerat, *Schimper,* 853! Samen, *Steudner,* 796! British East Africa: Aberdare Mountains, *James!*

6. **B. similis,** *Hemsl.* Shrubby, 2–3 ft. high, obscurely glandular-hairy. Stems rigid, erect, branched. Leaves longer than the internodes, subsessile, oblong-lanceolate, ½–1½ in. long, flat, more deeply crenate than those of *B. longiflora* and glabrescent. Flowers shortly stalked, 1–1¼ in. long. Calyx glandular, 5-lobed; lobes nearly equal, narrow, as long as the tube, obtuse or subacute, some of them usually bearing one or more lateral teeth. Corolla puberulous; lobes nearly equal and orbicular, overlapping, lateral oblique, margin irregularly toothed. Anthers slightly bearded at the top. Ovary densely strigose; style glabrous, shortly exserted. Capsule slightly exceeding the calyx.

Mozamb. Dist. Kilimanjaro: Kifinika Volcano, 9000–10000 ft., *Volkens,* 926!

This is apparently the most robust of the woody species.

7. **B. kilimandscharica,** *Engl. Hochgebirgsfl. Trop. Afr.* 384. Shrubby, 1–2 ft. high, very minutely glandular-hairy in almost all parts. Stems rigidly erect, with many slender, erect, almost adpressed branches. Leaves crowded, sessile or subsessile, thick, narrow-oblong, ¼–½ in. long, bullate-crenate, strongly recurved when dry. Flowers pink, very shortly stalked, ¾–1 in. long. Calyx ¼–⅓ in. long, almost equally 4-lobed; lobes united to the middle in lateral pairs, obtuse, often bearing a marginal tooth. Corolla about three times as long as the calyx; tube very slender, strongly curved, hairy inside; limb small, distinctly 2-lipped; upper lip hood-shaped, bearded inside, enclosing the stamens and style; lower lip slightly longer, divided into three nearly equal almost orbicular lobes, about 1 lin. in diam. Stamens attached near the top of the tube; anthers mucronate at the base, bearded. Ovary very hairy; style very slender, minutely hairy. Capsule oblong, compressed, hairy, about a third longer than the calyx. Seeds very small, longitudinally winged, but perfect ones not seen.—*B. Purtschelleri,* Engl. in Hans Meyer "Across E. Afr. Glaciers," 370, name only; Jahrb. xiv. Literaturb. 61.

Mozamb. Dist. German East Africa: Kilimanjaro: last zone of vegetation below perpetual snow, *Kirk!* 12000 ft., *Johnston!* Johannes Ravine 11000–12000 ft., *Volkens*, 1178!

8. **B. decurva,** *Hochst. ex Benth. in DC. Prodr.* x. 545. Shrubby, 1–2 ft. high, distinctly glandular-hairy in almost all parts. Stems rigidly erect, with few erect or almost adpressed branches. Leaves crowded, sessile, thick, oblong, from 6–12 lin. long, bullate-crenate recurved when dry and adpressed to the branches. Flowers very shortly stalked, about 1 in. long. Calyx 4–5 lin. long, unequally 5-lobed, the posterior one much shorter, the others narrow-oblong, very obtuse and often furnished with one or two obtuse teeth. Corolla more than twice as long as the calyx; tube wider and more abruptly curved than in *B. kilimandscharica*, Engl., minutely hairy inside; limb distinctly 2-lipped; upper lip hood-shaped, hairy inside and including the bearded mucronate anthers and the clavate style. Ovary very hairy; style very slightly hairy. Capsule oblong, hairy, a little longer than the calyx. Seeds not seen.—A. Rich. Tent. Fl. Abyss. ii. 135.

Nile Land. Abyssinia: side of Mount Silki, *Schimper*, 1329! Ghaba Valley, *Steudner*, 798!

Some of the Andine species are remarkably like this and *B. similis*, notably *B. santolinæfolia*, Benth., the *Euphrasia santolinæfolia*, H.B. & K. (Nov. Gen. et Sp. ii. t. 166). In foliage they are hardly distinguishable.

Order XCIII. **OROBANCHACEÆ.** (By Otto Stapf.)

Flowers hermaphrodite, zygomorphic. Calyx inferior, gamosepalous, 2–5-toothed or -lobed, rarely truncate, or spathaceous and open in front, or consisting of 2 lateral 1–2-toothed or linear divisions which are either quite free or more or less united at the base in front. Corolla gamopetalous, tubular or funnel-shaped in the upper part, usually curved; limb oblique, 2-lipped or nearly equally 5-lobed; upper lip entire or 2-lobed, lower lip 3-lobed, lobes imbricate, the upper inside. Stamens 4, didynamous, usually inserted below the middle of the corolla-tube and enclosed in it; filaments filiform; anthers dorsifixed, conniving or cohering (by means of hairs) in pairs; cells parallel or slightly diverging, often mucronate, longitudinally dehiscent, both fertile or one empty. Disc hypogynous, obscure or produced anticously into a nectarial gland. Ovary superior, 1-celled; carpels 2, median, rarely 3; style simple, terminal; stigma orbicular or 2–3-lobed. Placentas 4, separate or contiguous or partly fused in pairs; ovules very numerous, anatropous. Capsule 1-celled, more or less dehiscing with 2 valves. Seeds very numerous, small; testa often foveolate-reticulate; endosperm fleshy. Embryo globose, of few cells, undifferentiated.—Annual or perennial parasitic herbs, almost perfectly destitute of chlorophyll, variously coloured, but never green. Stems usually simple, solitary or fascicled, more or less fleshy. Leaves reduced to, often fleshy, scales,

few or many. Flowers in terminal racemes or spikes, supported by bracts and often also by bracteoles.

Species over 130, almost exclusively in the northern hemisphere, particularly in the warm-temperate regions.

Calyx tubular-campanulate, obtusely 4–5-lobed . .	1. CISTANCHE.
Calyx campanulate, acutely 3–5-dentate or 3–5-fid or split to the base in front and on the back . .	2. OROBANCHE.

1. **CISTANCHE,** Hoffm. et Link; Benth. et Hook. f. Gen. Pl. ii. 983.

Calyx persistent, tubular-campanulate, 4- or 5-lobed; lobes obtuse, rounded, subequal or the two posticous narrower. Corolla tubular below, more or less funnel-shaped above, more or less curved or at length abruptly bent; limb spreading, oblique, 5-lobed; lobes broad, equal or nearly so. Stamens 4, didynamous, subexserted, inserted deep down in the corolla-tube; anthers usually densely bearded and coherent by the hairs; cells parallel, often acute or mucronate at the base. Ovary 1-celled, with 4 distinct placentas, many-ovuled; style curved at the apex; stigma large, orbicular. Capsule 2-valved, dehiscing in the median plane. Seeds very numerous, minute, foveolate-reticulate.—Parasitic plants, variously coloured, destitute of chlorophyll, glabrous or cobwebby. Stems succulent, often bulbously thickened at the base, simple. Leaves reduced to fleshy scales. Flowers bracteate and 2-bracteolate, spicate, rather large, white, yellow or purplish.

Species about 10 in the dry regions of Portugal, Spain, North Africa, and through the Orient to India.

1. **C. lutea,** *Hoffmg. & Link, Fl. Port.* i. 319, *t.* 63. Stem swollen at the base (often more than 1 in. in diam.), stout, fleshy, like the whole plant (except the stamens and the inside of the corolla-tube), glabrous, ½–1½ ft. high. Scales fleshy, lurid purplish or tinged with yellow, lower crowded, triangular, caudate-acuminate or acute, upper ovate-lanceolate or lanceolate, scattered, ½ to 1 in. long, margins sometimes thin and more or less transparent. Spike cylindric, rounded at the top, or when young comose by the uppermost bracts, from a few inches to 1 ft. long, usually dense, rarely somewhat lax; bracts ovate-oblong to lanceolate, as long as the calyx or shorter or longer, in substance and colour like the stem-scales; bracteoles linear, about as long as the calyx. Calyx wide-tubular-campanulate, 6–10 lin. long, rarely longer, 5-lobed to ⅓ or almost ½ of its length; lobes broad, elliptic-oblong, rounded, more or less imbricate, margins membranous. Corolla bright yellow; tube 1–2 in. long, at first almost straight, then more or less curved, at length often abruptly bent at the middle, cylindric below the middle, wide funnel-shaped above it, more or less villous below the insertion; lobes much broader than long, 2½–3 lin. long, rounded. Filaments hairy towards the base; anthers woolly, cells acute to mucronulate at the base.—Reichb. Pl. Crit. vii. t. 700, fig. 939. *Lathræa Phelipæa,* Linn.

Sp. Pl. ed. ii. 844; Brot. Fl. Lus. i. 184. *Orobanche tinctoria*, Willd. Sp. Pl. iii. 353. *Phelipæa lutea*, Desf. Fl. Atl. ii. 60, t. 146; Brunner in Flora, 1840, ii. Beibl. 1 & 4; Boiss. Fl. Or. iv. 500. *Ph. tinctoria*, Walp. Rep. iii. 462; Reut. in DC. Prodr. xi. 13. *Ph. senegalensis*, Reut. l.c. *Ph. lusitanica*, Coss. Not. Crit. Espagne, 43. *Ph. Brunneri*, Webb in Hook. Niger Fl. 167.

Upper Guinea. Senegambia: Cape Verde, and near N'Boro, *Brunner*; sandy shore near St. Louis, *Roger !* and without precise locality, *Sieber*, 53 !

North Central. Southern Sahara: North of Lake Chad, common near Belgaschifari, *Vogel !*

Nile Land. Nubia: coast region, *Schweinfurth*, 568 ! *Bent !* Singat, *Schweinfurth*, 310 ! by the Nile, at the 6th cataract, *Schweinfurth*, 717 ! Eritrea: near Acrur, 6300 ft., *Schweinfurth & Riva*, 1349 ! Sennar, *Kotschy*, 261 ! French Somaliland: Gulf of Tajura, *Lord !*

Also in Spain and throughout North Africa and the Orient to India.

I am not certain whether Lord's Somaliland specimens actually belong to *C. lutea*. They are rather small, with calyces $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long and corollas up to $1\frac{1}{2}$ in. long. On the other hand, a fruiting specimen, collected by Hildebrandt (2583) from Taita, in British East Africa, belongs very probably here. Our knowledge of the species of *Cistanche* leaves much to be desired, and an examination of the plants in the field is very desirable, particularly with respect to their variability.

2. **OROBANCHE**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 984.

Calyx persistent, campanulate, equally or unequally 3–5-dentate or 3–5-fid or split to the base in front and on the back with the divisions entire or 2-fid. Corolla tubular, often curved, with a more or less widened throat; limb more or less distinctly 2-lipped; upper lip entire, emarginate or 2-lobed; lower lip 3-lobed with raised folds between the lobes. Stamens 4, didynamous, included, inserted below the middle of the tube; filaments usually thickened at the base; anthers often coherent, cells parallel or slightly divergent and mucronate at the base. Ovary 1-celled with 4 placentas, approximate or contiguous in pairs, many-ovuled; style curved or almost straight; stigma funnel-shaped, peltate or distinctly 2-lobed, lobes lateral. Capsule dehiscing in the median plane, 2-valved, valves often cohering by the persistent style. Seeds very numerous, minute, subglobose; testa foveolate. Embryo minute, globose, consisting of a few cells, embedded in endosperm.—Parasitic plants, destitute of chlorophyll, variously coloured, usually more or less covered with gland-tipped papillose hairs. Stems succulent, often bulbously thickened at the base, simple or branched, Leaves reduced to scales. Flowers bracteate, with or without bracteoles, spicate or racemose.

Species 80–90, mainly in the temperate and warm-temperate regions of the northern hemisphere.

* TRIONYCHON.—Bracts and bracteoles present. Calyx usually gamosepalous, 4-toothed or 4-fid, rarely with a small fifth tooth at the back. Corolla bilabiate.

Flowers $5\frac{1}{2}$–$7\frac{1}{2}$ lin. long; corolla-throat slightly widened	1. *O. ramosa.*
Flowers 9–10 lin. long; corolla-throat conspicuously widened	2. *O. Muteli.*

** OSPROLEON.—Bracts present; bracteoles 0. Calyx split in front and on the back; lateral divisions entire or 2-toothed or 2-fid. Corolla bilabiate.

Corolla conspicuously inflated below the stamens, which are inserted near the middle of the tube, distinctly curved or bent above the constriction, blueish in the upper part	3. *O. cernua.*
Corolla scarcely widened below the stamens, which are inserted low down in the tube, gradually and gently curved from the base, yellowish with purple veins	4. *O. minor.*

1. **O. ramosa,** *Linn. Sp. Pl. ed.* i. 633. Stem slender, branched (usually from the base), rarely simple, yellowish, up to more than 1 ft. high, like the whole plant more or less glandular-hairy. Scales ovate to ovate-lanceolate, $2\frac{1}{2}$–5 lin. long, sometimes almost glabrous. Inflorescence spicate or the lowest flowers pedicelled, many-flowered, at length elongated and loose; bracts ovate-oblong to lanceolate, acute, $2\frac{1}{2}$–$4\frac{1}{2}$ lin. long; bracteoles linear-subulate, usually exceeding the calyx-tube. Calyx 4–5 lin. long, firmly membranous with prominent nerves, divided to about the middle into 4 triangular acuminate or caudate-acuminate 3-nerved teeth. Corolla pale yellow with a blueish limb, $5\frac{1}{2}$–$7\frac{1}{2}$ lin. long; tube constricted about 2–3 lin. above the base, thin and whitish below, gradually and moderately widened above the constriction into the throat, which is about $1\frac{1}{2}$–2 lin. across, dorsal outline gently curved; upper lip 2-lobed, porrect, lobes very broad, subacute; lower lip with 3 subequal, rotundate, entire or repand, ciliate lobes. Filaments about 2–$2\frac{1}{2}$ lin. long, glabrous or slightly villous at the base; anthers glabrous or with a few cilia at the base (*Beck*). Style glabrous or with a few gland-tipped hairs; stigma funnel-shaped, obscurely 3–4-lobed, whitish or blueish.—Sowerb. & Smith, Engl. Bot. iii. t. 184; Thunb. Fl. Cap. ed. Schult. 454; Reichenb. Pl. Crit. vii. t. 696, figs. 933–934; Beck, Monogr. Orob. in Bibl. Bot. iv. 87, t. i. fig. 10. *O. ramosa,* var. *interrupta,* Beck, l.c. 89. *O. interrupta,* Pers. Syn. ii. 181. *Phelipæa ramosa,* C. A. Meyer, Verz. Pfl. Cauc. 104; Reichb. fil. Ic. Fl. Germ. xx. 88, t. 1773; A. Rich. Tent. Fl. Abyss. ii. 136.

Nile Land. Eritrea: Habab; Nafka, *Hildebrandt,* 511 (ex *Beck*). Abyssinia: Tacazze Valley, *Petit,* 238! near Hiea, *Quartin-Dillon;* and without precise locality, *Schimper,* 226!

Common throughout South and Central Europe, and found also in Egypt; introduced into South Africa. A parasite on hemp, tobacco, and tomato plants, and numerous other species.

2. **O. Muteli,** *Schultz in Mutel, Fl. Franç.* ii. 353, *& Atl. t.* 43, *fig.* 314; *Suppl. t.* 2, *fig.* 5. Stem slender, branched, rarely simple, 4–10 in. high, like the whole plant more or less glandular-hairy. Scales ovate to lanceolate, 2½–5 lin. long, sometimes almost glabrous. Inflorescence spicate or the lowest flowers distinctly pedicelled, many-flowered, usually rather loose; bracts oblong-ovate to lanceolate, acute, 3–5 lin. long; bracteoles linear-subulate, usually exceeding the calyx-tube. Calyx 4–5 lin. long, firmly membranous with more or less prominent nerves, divided to about the middle into 4 triangular or lanceolate, acuminate or caudate-acuminate, 3-nerved teeth. Corolla pallid below, otherwise blueish or lilac, 9–10 lin. long; tube constricted about 3–4 lin. above the base, then widened into the funnel-shaped throat, which is about 2½ lin. across, dorsal outline more or less curved; upper lip 2-lobed, porrect lobes rounded; lower lip with 3 subequal, rotundate, crenulate-dentate or repand, ciliolate lobes. Filaments 3½ lin. long, glabrous or slightly hairy at the base; anthers glabrous or slightly villous at the base. Style glabrous or sparingly glandular-hairy; stigma almost funnel-shaped, obscurely 2-lobed, whitish or yellowish.—Schultz in Flora, 1847, 67, 168; Beck, Monogr. Orobanch. in Bibl. Bot. iv. 95, t. 1, fig. 13 (3) (vars. δ 3, *Promunturii* and ε *typica*) *Phelipæa ramosa*, Harvey, Gen. S. Afr. Pl. ed. ii. 274, not of C. A. Meyer; var. *Muteli*, Boiss., Fl. Or. iv. 499. *P. Muteli*, Reuter in DC. Prodr. xi. 8, partly; Reichb. fil. Ic. Fl. Germ. xx. 89, t. 1771. *P. Hohenackeri*, Reuter in DC. Prodr. xi. 10. *P. reuteriana*, Reichenb. f. l.c. xx. 117, t. 1839, fig. ii. *Phelipanche Mutelii*, Pomel, Nouv. Mater. Fl. Atl. 106.

Nile Land. Eritrea: Habab, *Hildebrandt*, 511, partly. French Somaliland: Gulf of Tajura, *Lord!*

Very common throughout the Mediterranean region; parasitic on *Compositæ, Leguminosæ, Labiatæ*, &c.

3. **O. cernua,** var. **Desertorum,** *Beck, Monogr. Orob. in Bibl. Bot.* iv. 142, *t.* ii. *fig.* 33 (?). Stems solitary or fascicled, simple, stout, like the whole plant more or less glandular and cobwebby-pubescent, rarely glabrescent, up to 16 in. high. Scales ovate or ovate-lanceolate, acute or acuminate, entire or denticulate, 2½–5 lin. long. Spike cylindric, many-flowered, dense, rounded at the apex, up to 8 in. long. Bracts ovate to ovate-lanceolate, acute or acuminate, up to ½ in. long; bracteoles 0. Calyx split to the very base or almost so in front and on the back, 4–5 lin. long, divisions ovate, either entire or caudate-acuminate or more or less deeply bifid with usually unequal caudate-acuminate or acuminate teeth, yellowish or blueish, sparingly glandular. Corolla 7½–9 lin. long, whitish and inflated below the insertion of the stamens, particularly after flowering, moderately constricted and often bent at the middle, slightly widened upwards into the blueish throat; limb small; upper lip emarginate or 2-lobed; lobes crenulate with glabrous margins; lower lip equally 3-lobed; lobes rounded or sub-acute, otherwise like those of the upper lip. Stamens inserted just below the middle of the tube. Filaments glabrous, rarely sparsely glandular hairy; anthers glabrous or sparingly hairy. Style glabrous

or sparingly hairy; stigma 2-lobed, white or whitish.—*O. cernua*, Boiss. Fl. Or. iv. 514; Baker in Kew Bulletin, 1894, 339, not of Loefl. *O. curviflora*, Viv. Pl. Æg. Dec. iv. 22, t. ii. fig. 17.

Nile Land. Nubia: coast region, *Bent!* British Somaliland, *Miss Edith Cole! Mrs. Lort Phillips!* Golis Range, *Drake Brockman*, 161!

Also in Socotra, Arabia, and throughout the Orient to North-western India. The typical form of *O. cernua*, Loefl. (Beck, l.c. 143) has smaller flowers and is more or less limited to South-west Europe.

4. **O. minor,** *Sutton in Trans. Linn. Soc.* iv. 179. Stems solitary or fascicled, rather slender, simple, 4–20 in. high, like the whole plant more or less glandular-hairy. Scales crowded near the base, distant higher up, ovate-oblong to lanceolate, $\frac{1}{4}$–$\frac{2}{3}$ in. long. Spike cylindric, many- or (in weak specimens) few-flowered, usually rather loose, except when young, with the lower flowers often remote, up to more than 1 ft. long. Bracts like the scales, but more acuminate; bracteoles 0. Calyx divided to the very base in front and on the back; divisions ovate to ovate-lanceolate, entire and long caudate-acuminate or 2-toothed, up to $\frac{2}{3}$ in. long, 1-nerved. Corolla up to $\frac{2}{3}$ in. long, yellow with purplish veins towards the limb, tubular, slightly constricted at the middle; upper lip 2-lobed or emarginate; lower lip equally or subequally 3-lobed; all the lobes rounded, plicate crenulate-dentate, glabrous along the margin. Stamens inserted 1–1$\frac{1}{2}$ lin. above the base; filaments more or less hairy, at least below; anthers usually puberulous. Style mostly glandular-hairy; stigma 2-lobed, lurid-purple.—Sowerb. & Smith, Engl. Bot. vi. t. 422; Reuter in DC. Prodr. xi. 29; Reichb. Pl. Crit. vii. 30, tt. 652–3; Reichb. fil. Ic. Fl. Germ. xx. 103, t. 1804; Boiss. Fl. Or. iv. 512; Beck, Monogr. Orob. in Bibl. Bot. iv. 251, t. iv. fig. 82. *O. abyssinica*, A. Rich. Tent. Fl. Abyss. ii. 137.

Nile Land. Eritrea: Aidereso, 4100 ft., *Schweinfurth*, 1416! 1436! near Acrur, 6300 ft., *Schweinfurth*, 1050! Abyssinia, *Quartin-Dillon & Petit! Plowden! Parkyns! Schimper!* Uganda: Ruwenzori; cultivated land, 6000–7000 ft., *Scott-Elliot*, 7819! between Eldama Ravine and Mau, 7000–7500 ft., *Whyte!* Unryoo; Bugoma, *Dawe*, 750!

Mozamb. Dist. German East Africa: Kilimanjaro, 4000–6000 ft., *Volkens*, 545! *Johnston!* Usambara, *Buchwald*, 453! Portuguese East Africa: mountains east of Lake Nyasa, *Johnson!* British Central Africa: Nyasaland; between Mandala and Kibana, *Scott!* between Kondowe and Karonga, 2000–6000 ft., *Whyte!* Nyika Mountains, 4000–6000 ft., *Whyte!* Tanganyika Plateau at Fort Hill, *Whyte!*

Imperfectly known species.

5. **O Schultzii,** forma **pyramidalis,** *Beck, Monogr. Orob. in Bibl. Bot.* iv. 112. Stems slender, simple, 4–24 in. long, bulbously thickened at the base, glandular-hairy. Scales numerous, ovate or narrowly rhomboid, acuminate, or the upper ovate-lanceolate, denticulate towards the base, 2$\frac{1}{2}$–5 lin. long. Inflorescence spicate or usually subspicate and tufted at top, many-flowered, cylindric, dense, elongate and acuminate, the lowest flowers often distinctly pedicelled; bracts lanceolate, reaching to the tips of the calyx-teeth; bracteoles slightly shorter,

narrow. Calyx obliquely campanulate, copiously glandular-hairy; teeth linear-lanceolate, much longer than the tube, with a prominent middle-nerve. Corolla pallid below, otherwise blue, 8–10 lin. long, constricted above the insertion of the stamens, moderately curved, gradually widened into the throat; limb glabrous; upper lip 2-lobed, lobes elliptic, rotundate-acuminate or acute, repand; lower lip equally 3-lobed, lobes elliptic-acuminate or rotundate, repand or denticulate, plicate. Filaments inserted $2\frac{1}{2}$ lin. above the base, sparingly and shortly hairy near the base; anthers glabrous. Stigma 2-lobed, white.

Nile Land. Abyssinia: near Ghaza (Ghaga) according to Beck (without indication of the collector).

O. Schultzii is a Mediterranean species, ranging from Morocco and Spain to Syria. The forma *pyramidalis* was originally described as a distinct species, *Phelipæa pyramidalis*, Reuter in DC. Prodr. xi. 7, from specimens collected by Boissier in Asia Minor. They have a very hairy corolla-limb with obtuse or subacute lobes and woolly anthers.

6. **O. tunetana,** var. **tacassea,** *Beck, Monogr. Orob. in Bibl. Bot.* iv. 118, *t.* ii. *fig.* 24. Stem slender, simple, densely white-tomentose, 3–5 in. high. Scales ovate-lanceolate, adpressed, subglabrous, $2\frac{1}{2}$–4 lin. long. Spike short, cylindric or subcapitate, dense or loose below, 3–10-flowered, rounded at the top; bracts ovate-lanceolate, shorter than the calyx, and like it densely woolly tomentose. Calyx campanulate, teeth shorter than the tube, lanceolate. Corolla inflated at the base, constricted above the ovary, then conspicuously curved forwards and widened into the violet throat, copiously hairy, $8\frac{1}{2}$–9 lin. long; upper lip deeply 2-lobed, lobes elliptic, acuminate, inciso-crenate; lower lip deflexed, lobes large, ovate or elliptic, denticulate. Filaments quite glabrous; anthers long-acuminate, subglabrous. Stigma-lobes confluent, white.

Nile Land. Abyssinia: Tacazze Valley, at Semam, *Steudner*, according to Beck.

Typical *O. tunetana* is a native of Tunis, and seems to be a well-marked species.

ORDER XCIV. **LENTIBULARIEÆ.** (By Otto Stapf.)

Flowers hermaphrodite, zygomorphic. Calyx inferior, deeply 2–5-partite, regular or more or less 2-lipped, or the sepals free to the base. Corolla gamopetalous, 2-lipped, spurred, rarely saccate; tube very short; upper lip interior, entire to 2-lobed; lower entire to 2–3-lobed, usually with a vaulted, more or less 2-gibbous palate. Stamens 2, anticous, attached to the base of the corolla, slightly converging in front of the stigma; filaments short, usually curved and asymmetrically thickened; anthers 2-celled; cells diverging, confluent, dehiscing by a common slit. Ovary superior, 1-celled; carpels 2, median; style simple, short or very short; stigma more or less distinctly 2-lipped, upper lip usually very small or obscure; placenta free central ovoid or globose, rarely reduced

to a short basal protuberance; ovules numerous, sessile and closely packed, rarely few or only 2, anatropous. Fruit a 1-celled, few- to many-seeded capsule, dehiscing irregularly or by 2–4 valves or circumscissile, very rarely 1-seeded and indehiscent. Seeds very small, variously shaped; testa thin or spongy or corky, rarely exuding mucilage; endosperm 0; embryo undifferentiated or with obscure protuberances (rudiments of the primary leaves) at the often flat or slightly concave apex, rarely with a plumule of subulate primary leaves or a distinct cotyledon.—Perennial, rarely annual herbs, aquatic or terrestrial (but always in wet places), with peculiar, usually utricular, contrivances for the capture and digestion of small organisms. Leaves rosulate or scattered on stolons, entire or divided, uniform or sometimes heteromorphic. Inflorescences terminal or axillary, peduncled, racemose, simple, rarely sparingly branched, bracteate; lowest bracts usually barren, adpressed; bracteoles 2 or 0 at the base of the pedicels; flowers very small to large, often showy, yellow, purple or blue.

Species about 200, in all parts of the world, excepting arid regions.

Calyx of 2 sepals; utricles bladder-like, ovoid or globose	1. UTRICULARIA.
Calyx deeply 5-partite; utricles tubular with 2 spirally-twisted arms	2. GENLISEA.

1. **UTRICULARIA**, Linn.; Benth. et Hook. f. Gen. Pl. ii. 987.

Sepals 2, free or united at the base, persistent and frequently enlarged in fruit, equal or slightly unequal. Corolla 2-lipped, spurred or rarely saccate; upper lip erect, entire or emarginate to bifid; lower lip usually much larger than the upper, usually with a vaulted, often much raised and 2-gibbous palate and a spreading or deflexed entire, crenulate or lobed margin. Stamens 2; filaments almost straight or curved, short, often winged on the outer side; anthers dorsifixed, cells subdistinct or quite confluent; pollen globose or depressed-globose, with or without few to many longitudinal slits and several pores. Ovary more or less globose, 1-celled; style indistinct or distinct, but short, persistent; stigma 2-lipped, anticous lobe much larger than the often obscure posticous; ovules numerous, rarely few, sessile on the free central fleshy placenta, anatropous. Capsule usually globose, breaking up into 2 valves or dehiscing irregularly. Seeds globose, ovoid, lenticular, hemi-elliptic, truncate-pyramidal or prismatic, smooth, reticulate, tubercled, glochidiate or variously winged, usually very small, exalbuminous. Embryo undifferentiated, with or without obscure protuberances (the beginnings of the primary leaves), rarely with a plumule of 9–12 more or less subulate primary leaves.—Rootless, aquatic or terrestrial or epiphytic herbs, nearly always provided with minute bladder-like organs for the capture and digestion of small organisms; annual or perennial with or without a resting season; the aquatic species reproducing themselves frequently from special resting buds

hibernacles) and the epiphytic sometimes from tubers. *Terrestrial and epiphytic species:* Primary axis developed, terminating with an inflorescence, producing at the base above the small primary leaves a rosette of foliage-leaves (rarely a solitary foliage-leaf) and non-axillary stolons, leaves and stolons showing no definite sequence and passing sometimes into each other. Stolons growing with inrolled or straight tips, either developed as rhizoids (growing downwards into the substratum and resembling roots) or creeping on or close to the surface of the substratum, often among moss and dwarf herbage, more or less branching and producing bladders, foliage-leaves and, from certain of their axils, flowering or barren (and then much stunted) shoots with a more or less developed basal tuft or rosette of leaves and stolons. Leaves petioled, normally always entire, linear to orbicular or reniform, rarely peltate, often decayed at the time of flowering, frequently producing bladders, stolons or adventitious shoots. *Aquatic species:* Primary axis arrested (according to *Goebel*), producing above or among the primary leaves one or several stolons. Stolons floating in still water or creeping on mud, rarely attached to stones and rocks in running water, often very long, growing with inrolled tips, branching; branches either all alike and resembling the primary stolons, producing from the flanks alternate or occasionally subopposite leaves and axillary or juxta-axillary inflorescences or branches heteromorphic, some of them growing downwards and producing only much reduced leaves and bladders. Leaves more or less divided into filiform or capillary segments; primary segments of the large-leaved species often imitating a whorl or half-whorl of pinnate leaves (rays), pinnæ more or less 2-seriate on the sometimes broadened midrib, usually forked at the base, each division again divided, 1–2 outer rays sometimes replaced by a hyaline cordate or reniform or more or less divided auricle, resembling a stipule; all or certain leaves or the leaves of certain branches producing bladders, usually in the place of leaf-segments. Bladders globose to ovoid, stalked, with an oblique subterminal or subbasal mouth, closed by a membranous flexible valve and a turned-in thickening (chin) of the lower rim, sometimes produced into an upper or an upper and lower lip, ciliate, fimbriate or furnished with stouter, variously shaped processes (tentacles). Inflorescences racemose, bracteate, peduncled, those of certain aquatic species held above water by a whorl of modified spongy leaves (floats); lower bracts often barren, adpressed; bracteoles 2, at the base of the pedicel, or 0.

Over 100 species, mainly in the tropics of both hemispheres.

The morphology of the vegetative parts of *Utricularia* is extremely complicated on account of the great plasticity of the organs and their readiness for sprouting. A very valuable account of those conditions was given by Dr. Goebel in Flora, 1889, 291–297, and 1904, 98–126, in his "Morphologische und biologische Studien," No. V. (in Ann. Jard. Bot. Buitenz. ix. 41) and in his "Organographie der Pflanzen," 444, but these publications concern mostly non-African species. The specimens at my disposal consisted of herbarium material and naturally left much to be desired. In fact, a really satisfactory classification of this genus will only be possible, when living or carefully collected and preserved spirit material is at hand.

* Terrestrial or epiphytic herbs with entire, petioled leaves.

† Bracts not produced below the point of attachment.

‡ Scape with 2 or more, often rosulate leaves at its base, never springing from a tuber.

§ Scape straight or flexuous, not twining; mouth of bladder opposite the stalk; sepals rounded, never decurrent on the pedicel.

Upper corolla-lip constricted below the middle; palate usually tubercled or transversely rugose (excepting *U. exilis*); seeds nearly hemi-elliptic with a narrow margin round the flat top face; bladders with 2 fringed lips.

Corolla 5–6 lin. long.

Spur distinctly shorter than the lower lip of the corolla.

Lower corolla-lip up to 4½ lin. long and 5 lin. broad; palate crests with long transverse wrinkles; seeds unknown . . . 1. *U. transrugosa.*

Lower corolla-lip 3–3½ lin. in diam.; palate crests tubercled or with short wrinkles; seed-margin denticulate . . . 2. *U. odontosperma.*

Spur as long as or longer than the lower lip of the corolla; seed margin entire . . . . 3. *U. sanguinea.*

Corolla 1½–3 lin. long.

Corolla purple, 2½–3 lin. long; palate tubercled . . . . 4. *U. tribracteata.*

Corolla pale purple, 1½–2½ lin. long; palate tubercled . . . 5. *U. Kirkii.*

Corolla white, yellow or slightly purplish, 1½–2¼ lin. long; palate smooth . . . . . 6. *U. exilis.*

Upper corolla-lip broad-ovate to subquadrate; palate smooth; seeds globose, smooth; upper lip of utricle with 4 short, stout fimbriæ.

Corolla purple or blue with a yellow palate, 2½–7 lin. long.

Corolla 6–7½ lin. long . . . 7. *U. linarioides.*

Corolla 2½–3½ lin. long . . . 8. *U. Welwitschii.*

Corolla yellow with an orange palate, 1½–1¾ lin. long . . . . 9. *U. firmula.*

§§ Scape frequently twining; sepals acute to acuminate, at length often decurrent on the pedicel; mouth of bladder close to the stalk with 2 horn-like tentacles.

Corolla 9–10 lin. long; upper lip over 5 lin. long, much constricted below the middle . . . . . 10. *U. Baumii.*

Corolla under 9 lin. long; upper lip under 4 lin. long, more or less oblong, rarely ovate.
Lower corolla-lip at least ½ as long as the spur.
Corolla 6–8 lin. long; upper lip much exceeding the upper sepal . . 11. *U. prehensilis.*
Corolla not over 4½ lin. long; upper lip not or only slightly exceeding the upper sepal.
Spur about as long as the lower corolla-lip.
Corolla yellow, up to 4 lin. long . 12. *U. andongensis.*
Corolla blue with a white palate, up to 3 lin. long . . . 13. *U. spiralis.*
Spur distinctly longer than the lower corolla-lip.
Spur 2½ lin. long, subsubulate . 14. *U. Schweinfurthii.*
Spur 1½ lin. long, obliquely conic from a broad base . . 15. *U. tortilis.*
Lower corolla-lip less than ⅓ the length of the spur . . . . . 16. *U. micropetala.*

‡‡ Scape with a solitary leaf at its base, springing from a tuber.
Leaves up to 2 in. long; blade ligulate or spathulate, about as long as the petiole . 17. *U. Mannii.*
Leaves up to 1 in. long; blade lanceolate or linear above the middle, much longer than the petiole . . . . . 18. *U. bryophila.*

†† Bracts produced below the point of attachment.
Leaf-blades linear-lanceolate; bracts orbicular-ovate, attached near the middle; bracteoles 0; seeds smooth . . . . . 19. *U. subulata.*
Leaf-blades orbicular; bracts ovate-lanceolate to lanceolate, attached near the base; bracteoles 2; seed glochidiate . . . 20. *U. striatula.*

** Aquatic herbs, floating in still water or creeping on mud, very rarely in running water and then firmly attached; leaves divided into 2 to very many, more or less capillary segments.
Attached by means of adhesive claw-shaped rhizoids, destitute of bladders; seeds mucilaginous . . . . . 21. *U. rigida.*
Floating or creeping on mud; seeds never mucilaginous.

† Inflorescence held above water by a whorl of floats.
Upper corolla-lip entire; stolons and leaf-rays glabrous or sparingly hispidulous near the tips; leaves usually auricled.
Leaf-auricles large, hyaline, denticulate or more or less divided into hyaline laciniæ; capsule quite enveloped by the much enlarged, closed and cuneately decurrent calyx.

Corolla 3–3½ lin. long; leaf-auricles usually denticulate . . . 22. *U. Thonningii.*
Corolla 2–2½ lin. long; leaf-auricles with numerous, long, narrow, flexuous laciniæ . . . . . 23. *U. trichoschiza.*
Leaf-auricles cut up into deeply and often repeatedly divided, rather rigid and rigidly ciliate segments; capsule more or less exposed; calyx not or obscurely decurrent on the upward thickened pedicel . . . . 24. *U. stellaris.*
Upper corolla-lip 2-lobed to the middle; stolons and leaf-rays finely villous . . 25. *U. villosula.*

†† Inflorescences without floats.

Scapes usually many-flowered, rather stout, up to 1 ft. long; leaves up to 3 in. long; capsules 2–3 lin. in diam.; seeds 4–8 . . . . . 26. *U. foliosa.*
Scapes 4–1-flowered, very slender, short; leaves rarely up to 9 lin. long, usually much shorter; capsules up to 1½ lin. long, usually many-seeded (see *U. cymbantha*).

Stolons not conspicuously flattened; scapes without a whorl of stolons at the base, 1–2-flowered; fruiting pedicels nodding.

Leaves 3–9 lin. long; leaf-segments more or less setulose.

Leaves 6–9 lin. long; seeds broadly winged . . . . . 27. *U. platyptera.*
Leaves 3–5 (rarely to 8 lin. long); seeds narrowly winged

Only the ultimate leaf-segments setulose, stolons glabrous; corolla up to 4½ lin. long; spur shorter than the lower lip 28. *U. reflexa.*
Leaves and stolons hispidulous; corolla up to 3 lin. long; spur longer than the lower lip 29. *U. charoidea.*

Leaves up to 3 lin. long, glabrous.

Leaves multifid, 1–3 lin. long; corolla 4–4½ lin. long . . 30. *U. diploglossa.*
Leaves forked, usually under 1 lin. long, segments entire or forked again; corolla 1 lin. long . . 31. *U. cymbantha.*

Stolons conspicuously flattened; scapes with a whorl of stolons at the base, 1–4-flowered; fruiting pedicels straight.

Corolla 3–5 lin. long . . . . 32. *U. obtusa.*
Corolla 2½–3 lin. long . . . . 33. *U. exoleta.*

1. **U. transrugosa,** *Stapf in Dyer, Fl. Cap.* iv. ii. 428. A delicate, terrestrial herb, including the inflorescence 4–6 in. high; rhizoids

in tufts at and near the base of the peduncle, short and scarcely branched; stolons, leaves and bladders unknown. Peduncle straight or nearly so, filiform, simple, 3–1-flowered; barren bracts few, remote, like the fertile ovate, about ½ lin. long; bracteoles somewhat narrower than the bract. Sepals subequal, rotundate-elliptic to suborbicular, 1¼–1½ lin. long. Corolla pale purple with a large yellow palate, about 5 lin. long; upper lip obovate, subemarginate, constricted towards the base, over 2½ lin. long; lower lip suborbicular, up to 4½ lin. long and 5 lin. broad, spreading; palate double-crested, crest transversely rugose; spur straight, subhorizontal, cylindric, acute, 3 lin. long. Anthers over ½ lin. long. Style about as long as the stigma; anticous stigmatic lobe broad-ovate. Capsule and seeds unknown.—Stapf in Hook. Ic. Pl. t. 2796, figs. 16–17. *U. sanguinea*, S. Moore in Journ. Bot. 1903, 405, not of Oliver.

Mozamb. Dist. Mashonaland: in running water, near Salisbury, *Rand*, 517!

Also in the Transvaal.

2. **U. odontosperma,** *Stapf.* A delicate, small herb. 3–7 in. high. Stolons finely filiform, branched, forming small matted tufts, hidden among moss; rhizoids numerous from the base of the scapes, 3–4 lin. long. Leaves one at the base of the scape and others scattered on the stolons, persistent or decayed at the time of flowering; blades narrowly linear, gradually narrowed into the petiole, obtuse, 1½–2½ lin. long, under ½ lin. broad; petiole up to 3½ lin. long, very slender. Bladders from the stolons, and sometimes from the leaves (particularly the petioles), globose-ovoid, up to ½ lin. long, stalk short to almost as long as the bladder, mouth distinctly 2-lipped, lips fimbriate; lower lip much smaller than the upper; scape straight or slightly flexuous, simple, with very few and obscure scales, distantly 4–1-flowered; bracts and bracteoles ovate-lanceolate, acute, almost ½ lin. long; pedicel slightly exceeding the bract, at length up to 1 lin. long. Sepals about 1–1½ lin. long, obtuse, the upper ovate-orbicular, the lower more elliptic and often smaller. Corolla purple (?), 5 lin. long; upper lip 2½–3 lin. long, base broad, blade obovate, rounded, occupying one-half of the lip; lower lip subquadrate or rounded, 3–3½ lin. long, more or less parallel to the spur, palate obliquely raised, gaping wide, double-crested, crests tubercled or rugose; spur suddenly contracted from a very broad conic base, upper half cylindric, obtuse, 2–2½ lin. long; anthers ½ lin. long; filaments 1 lin. long, filiform. Style stout, distinctly shorter than the stigma; upper stigma-lip ovate, half as long as the large orbicular or obovate lower lip; capsule globose, 1½ lin. long; seeds irregular hemispheric or hemi-ellipsoid, top orbicular or elliptic with a narrow many-toothed margin, the teeth consisting of stout, short papillæ.

Mozamb. Dist. German East Africa: between Lake Tanganyika and Lake Rukwa, *Nutt!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan!* Blantyre, *Last!*

3. **U. sanguinea,** *Oliver in Journ. Linn. Soc.* ix. 153, *partly.* A delicate terrestrial herb, 4–5 in. high. Stolons filiform, up to more than 1 in. long, sparingly and remotely branched, apparently white and somewhat fleshy in the fresh state, showing a dark axile vascular strand when dry. Rhizoids capillary, 2–3 lin. long from the base of the scapes. Leaves in small rosettes at the base of the scape, and, scattered, on the stolons, present at the time of flowering, blades somewhat fleshy, orbicular to obovate-elliptic with a short cuneate base, 1–2½ lin. long; petioles 1–3 lin. long, or those of the rosette leaves very short: bladders from the stolons, leaf-blades and petioles, not very numerous, on slender stalks of often more than half their length, subglobose, ½ lin. long, mouth 2-lipped, lips fimbriate, upper rather large orbicular, lower very short. Scape straight, filiform, simple, 2–4-flowered; flowers distant; bracts ovate, ½ lin. long; bracteoles lanceolate, about as long as the bracts; pedicel up to ½ lin. long. Sepals subequal, 1½–2 lin. long, rotundate-elliptic, obtuse. Corolla very bright blood-red purple, 5–6 lin. long; upper lip over 2 lin. long, base broad, blade occupying about half of the lip, obovate to broad-oblong, subtruncate; lower lip broad cuneate-rotundate, 3 lin. long, deflexed, palate raised, slightly 2-crested, crests faintly tubercled; spur cylindric, rather longer than the lower lip, descending. Anthers about ½ lin. long. Capsule globose, 1½ lin. in diam.; seeds (not quite mature) truncate-pyramidal or conic, top flat elliptic or orbicular with a narrow margin.—Hiern in Cat. Afr. Pl. Welw. i. 788; Kam. in Engl. Jahrb. xxxiii., 96 (the Angola plant); Stapf in Hook. Ic. Pl. t. 2795, figs. 1–4.

Lower Guinea. Angola: Huilla; in swampy pastures and damp abandoned fields, 5000 ft., *Welwitsch*, 259!

Distinguishable from the similar *U. livida* by the long and apparently fleshy stolons, larger, more persistent leaves, larger bladders with longer stalks, almost blood-red flowers with a wide-open, scarcely tubercled palate.

4. **U. tribracteata,** *Hochst. in A. Rich. Tent. Fl. Abyss.* ii. 18. A delicate dwarf terrestrial herb, including the inflorescence 1½–3 in. high. Stolons finely filiform, much branched, forming small matted tufts; rhizoids numerous from the base of the peduncle, 3–4 lin. long. Leaves few at the base of the scape or scattered or in very small tufts from the stolons, usually decayed at the time of flowering; blades spathulate-cuneate, 1½–3 (rarely to 4) lin. long, rarely more than ½ lin. broad, gradually passing into the long (up to 5 lin.) and very slender petiole. Bladders from the leaves (particularly the petioles) and stolons, globose-ovoid, up to ½ lin. long, on a very short or somewhat longer (over ¼ lin.) stalk, mouth distinctly 2-lipped, lips fimbriate, lower lip much smaller than the upper. Peduncle straight or nearly so, filiform, simple, 4–1-flowered, the flowers of 3–4-flowered specimens scattered over the upper half of the floral axis; bracts and bracteoles very similar, equal, lanceolate, acute, up to ½ lin. long, lowest bracts often barren; pedicel about as long as the bracts or ultimately exceeding them. Sepals subequal, about 1¼–1½ lin. long, obtuse, the upper

orbicular to ovate-orbicular, lower elliptic. Corolla purple or purple and yellow, 2½–3 lin. long, upper lip 1½–2 lin. long, obovate, rounded or submarginate, constricted below the middle; lower lip subquadrate or rounded, 1½–2 lin. long, more or less parallel to the spur, palate much raised, usually to an acute angle, and parallel to the upper lip, double-crested, crests dark, minutely tubercled; spur straight or almost so, conic, often broad, as long as or longer than the lower lip. Anthers ⅓–½ lin. long; filaments filiform, ½–⅔ lin. long. Style about as long as the stigma; upper stigma-lip oblong or ovate, ½ as long as the large, rotundate lower lip. Capsule globose, ¼ lin. in diam.; seeds irregularly hemi-ellipsoid or shortly pyramidal, angular, ⅛–⅙ lin. long, top flat, more or less elliptic, with a fine membranous or obscure margin. Embryo-top flat or slightly concave.—Kam. in Engl. Jahrb. xxxiii. 99; Stapf in Dyer, Fl. Cap. iv. ii. 427, and in Hook. Ic. Pl. t. 2795, figs. 5–12. *U. elevata*, Kam. l.c. includ. var. *Macowani*.

Nile Land. Abyssinia: Shireh, in swamps, *Schimper*, 1943! swampy places on the mountains above Salamanka, 8100 ft., *Schimper*, 1149! Somaliland, *Miss Edith Cole!*

Also in the Transvaal. The Abyssinian specimens agree very well in habit with the form, described by Kamienski as *U. elevata*; but the corolla was evidently yellow and purple.

5. **U. Kirkii,** *Stapf in Dyer, Fl. Cap.* iv. ii. 428. A delicate, dwarf, terrestrial herb, 1–5 in. high. Stolons filiform, branched; rhizoids capillary from the base of the scapes. Leaves scattered on the stolons, often decayed at the time of flowering; blades spathulate-cuneate, up to 1½ lin. long and ½ lin. broad, gradually narrowed into the usually long and slender petiole. Bladders on the leaves, ovoid-globose, ⅓ lin. long, 2-lipped; upper lip suborbicular; lower very small, both fringed; mouth opposite the stalk. Scape straight or flexuous, simple with very few minute scales, 5–1-flowered; flowers rather distant, if 4 or 5, scattered over the upper half of the scape; bracts and bracteoles subequal, lanceolate, acute, usually under ½ lin. long: pedicels almost as long as or at last somewhat longer than the bract. Sepals 1 lin. long, obtuse (rarely the upper subacute); upper ovate-orbicular to orbicular; lower elliptic. Corolla pale purple with a darker upper lip, 1½–2½ lin. long, upper lip constricted below the middle, upper part somewhat fleshy, obovate-oblong to obovate-quadrate, about 1 lin. long, palate almost parallel to the upper lip, double crested, crests minutely but distinctly tubercled; spur 1½ lin. long, suddenly narrowed from a broad conic base into the slender cylindric turned-up more or less obtuse upper half. Style shorter than the stigma; upper stigma-lip oblong, about ½ the length of the lower suborbicular lower lip. Capsule globose, up to over 1 lin. in diam.; seeds shortly truncate-conic, often angular, top face elliptic or suborbicular, about ⅛ lin. long with a fine margin or a fine simple rim; embryo-top flat or slightly concave.—Stapf in Hook. Ic. Pl. t. 2795, fig. 13. *U. exilis*, Kam. in Engl. Jahrb. xxxiii. 97 (Rehmann, 6599, not Oliv.); var. *Ecklonii*, Kam. l.c. 98 (Kirk's plant); var. *hirsuta*, Kam. l.c.

Lower Guinea. German South-west Africa: Damaraland; Waterberg, *Dinter!*

Mozamb. Dist. Zanzibar, *Kirk!* German East Africa: Zanguebar, *Kirk!* British Central Africa: Batoka Country; Shindi stream, *Kirk!*

Also in the Transvaal. Very similar to *U. exilis*, but distinguished by the tubercled palate. Dinter's specimen from Waterberg was described by Kamienski as *U. exilis*, var. *hirsuta*, on account of the supposed presence of a dense tomentum of short hairs. I had an opportunity of examining the very specimens from which Kamienski described this variety, but was unable to find any hairs. The only thing that resembled hairs was a fine layer of an *Œdogonium* which coated the lower portions of the scapes. I also found apparently the same alga (in fructification) on the Transvaal specimens of *U. Kirkii*. The alga creeps up the scapes closely adpressed to them with the exception of the ends of the threads, which sometimes diverge.

6. **U. exilis,** *Oliver in Journ. Linn. Soc.* ix. 154. A delicate, very dwarf, terrestrial herb; stolons filiform, moderately branched. Leaves often decayed at the time of flowering, in small fascicles at the base of the scape or scattered along the stolons, narrowly spathulate or ligulate, narrowed into the long, slender petiole, up to 3 (or even more) lin. long, $\frac{1}{4}$–$\frac{1}{3}$ lin. broad. Bladders from the stolons and leaves, subglobose, about $\frac{1}{3}$–$\frac{2}{3}$ lin. long, upper lip broadly elliptic, as long as the bladder is wide at the mouth, lower very short, both lips fimbriate. Scape capillary, 1–2 in. high, 1–3-flowered, straight, simple, rarely with 1–2 branchlets. Flowers, if more than 1, distant; bracts and bracteoles subequal, ovate-lanceolate, $\frac{1}{3}$ lin. long; pedicel about as long as the bracts. Sepals orbicular to broad-elliptic, the upper usually broader, $\frac{3}{4}$ lin. long. Corolla $1\frac{1}{2}$–$2\frac{1}{4}$ lin. long, white, yellow or more or less purplish, with a yellow palate, which is sometimes streaked with purple; upper lip subquadrate or subobovate from a short broad base, slightly emarginate, fleshy, $\frac{5}{8}$–1 lin. high; lower lip subquadrate or somewhat broader than long, obscurely undulate, $\frac{5}{8}$–1 lin. long, palate smooth with obscure ridges; spur straight or curved, wide funnel-shaped at the base rather suddenly contracted at or below the middle, then cylindric, obtuse, straight and subhorizontal or curved upwards. Anther $\frac{1}{4}$ lin. long. Style very short, but distinct, conical; upper lip of the stigma ovate to semi-orbicular, half as long as the obovate-quadrate lower lip. Capsule globose, 1 lin. in diam.; seeds irregularly hemispheric or hemi-ellipsoid, more or less angular, $\frac{1}{16}$–$\frac{1}{9}$ lin. long, sometimes compressed and almost transparent near the hilum, top face with a clean edge.—Hiern in Cat. Afr. Pl. Welw. i. 788; Kam. in Engl. Jahrb. xxxiii. 97, and in Baum, Kunene-Samb. Exped. (partly, and exclusive of the varieties), 372.

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2545!

Lower Guinea. Angolo: Pungo Andongo; among the rocks of Pedras de Guinga, *Welwitsch*, 254! near Catete and Luxillo, *Welwitsch*, 255! near Lake Quibinda, *Welwitsch*, 256! Huilla; Humpata Plateau, 4800–5000 ft., *Welwitsch*, 253! between Eme and the Lopolla River, *Welwitsch*, 252! between Hartebeest and Löwenpan, 3600 ft., *Baum*, 116! German South-west Africa: Amboland; Olukunda, *Rautanen!*

The varieties *bryoides* and *nematoscapa*, admitted by Hiern, represent hardly more than states differing in the colour of the corolla and in size, and come entirely under the description which Welwitsch gave of his No. 253.

7. **U. linarioides,** *Welw. ex Oliver in Journ. Linn. Soc.* ix. 151. A slender terrestrial herb; rhizoids filiform, very much branched. Leaves obovate-spathulate, attenuated into the long slender erect (though weak) petiole, usually decayed at the time of flowering; green blade over 1 lin. long, $\frac{1}{2}$–$\frac{3}{4}$ lin. broad; petiole about $\frac{1}{2}$–$\frac{2}{3}$ in. long. Pitchers unknown. Scape stoutly filiform, 8–16 in. long, erect, straight or flexuous, simple or very sparingly branched, with distant lanceolate basifixed small scales, up to 6-flowered. Flowers distant by less than their own length; bracts and bracteoles lanceolate, not quite a line long, subequal, pedicels shorter than the bracts. Sepals equal, orbicular, concave, about 1 lin. in diam., thin, yellow. Corolla 6–7$\frac{1}{2}$ lin. long (from the tip of the upper lip to the end of the spur), intensely purple with a yellow palate; upper lip broadly ovate to subquadrate, slightly emarginate, 2 lin. long; lower lip very broad, semiorbicular, slightly wavy, 3$\frac{1}{2}$–4$\frac{1}{2}$ lin. long, palate with 2 low smooth ridges; spur slender, acute, usually more or less descending, about 4 lin. long. Anthers $\frac{1}{2}$ lin. long. Stigma subsessile; upper lip ovate-lanceolate, shorter than the very broad depressed-orbicular lower lip. Capsule and seeds unknown.—Hiern in Cat. Afr. Pl. Welw. i. 787. *U. linearioides*, Kam. in Engl. Jahrb. xxxiii. 94 (excl. of the Madagascar specimens).

Lower Guinea. Angola: in spongy places by streams throughout the Lopollo Country, 5000–5200 ft., *Welwitsch*, 266!

8. **U. Welwitschii,** *Oliver in Journ. Linn. Soc.* ix. 152. An annual, very slender, terrestrial herb. Rhizoids capillary, more or less branched. Leaves usually decayed at the time of flowering, loosely rosulate at the base of the scape and scattered on the rhizoids, elongate-spathulate, very narrow, very gradually passing into the long petiole, with it up to over 2 in. long, $\frac{1}{3}$ lin. broad. Pitchers ovoid, narrowed at the mouth, $\frac{1}{3}$ lin. long; upper lip ovate, with 4–5 short rigid hairs; lower lip a naked rim. Scape filiform, more or less flexuous, $\frac{1}{2}$ to more than 1 ft. high, simple or sparingly branched, with few lanceolate scales, 1 lin. long. Flowers distant, 5–16; bracts and bracteoles subequal, lanceolate, acuminate, $\frac{2}{3}$ lin. long; pedicel not or scarcely exceeding the bracts. Sepals equal, orbicular, very concave, 1 lin. long. Corolla 2$\frac{1}{2}$–3$\frac{1}{2}$ lin. long (from the tip of the upper lip to the end of the spur), purple or blue with a deep yellow palate; upper lip broadly ovate, entire or nearly so, about 1$\frac{1}{2}$ lin. high; lower lip semiorbicular, broader than long, wavy; palate broad, smooth, ridges broad and low; spur rather slender, conic, straight or curved upwards, usually descending, 2–3 lin. long, densely and minutely papillose. Anthers about 1$\frac{1}{2}$ lin. long. Pistil bottle-shaped with a very short stout neck; stigma subsessile; upper lip small, broadly triangular; lower lip truncate, broad and short. Capsule globose, 1 lin. in diam. Seeds angular-globose,

$\frac{1}{6}$ lin. in diam., smooth, reticulate (?).—Hiern in Cat. Afr. Pl. Welw. i. 788; Kam. in Engl. Jahrb. xxxiii. 93, and in Baum, Kunene-Samb. Exped. 372.

Lower Guinea. Angola: Huilla; near Lopollo, *Welwitsch*, 263! near the Kuebe River, 2900 ft., *Baum*, 305!

Mozamb. Dist. German East Africa: lower plateau north of Lake Nyasa, *Thomson!*

9. **U. firmula,** *Welw. ex Oliver in Journ. Linn. Soc.* ix. 152. An annual, delicate, terrestrial herb. Rhizoids capillary, more or less branched. Leaves in scanty rosettes at the base of the scape and scattered on the rhizoids, usually decayed at the time of flowering, obovate-spathulate to linear-spathulate, more or less gradually attenuated into the long very slender petiole, with it up to 4 lin. long, $\frac{1}{2}$ lin. broad. Pitchers from the leaves and the rhizoids, ovoid, mouth narrow, upper lip short with 4 short rigid hairs; lower lip a naked rim. Scape filiform, simple or branched with the branches stiff and suberect, up to 8 in. high, scales minute, lanceolate. Flowers usually numerous, up to 20 or, in branched specimens, even more, 2–3 lin. distant; bracts and bracteoles subequal, bracts ovate to ovate-lanceolate, bracteoles lanceolate, $\frac{1}{3}$ to over $\frac{1}{2}$ lin. long; pedicels shorter than the bracts. Sepals orbicular, rather broader than long, very concave. Corolla $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, yellow with an orange-coloured palate; upper lip quadrate, slightly bilobed, emarginate or entire, fleshy, about $\frac{1}{2}$ lin. high, lower lip distinctly broader than long, slightly 3-lobed, $\frac{1}{2}$–$\frac{2}{3}$ lin. long; spur cylindric or conic-cylindric from a short wide base, usually straight, descending, 1–$1\frac{1}{2}$ lin. long. Anthers $\frac{1}{6}$–$\frac{1}{4}$ lin. long. Pistil bottle-shaped, with a short neck; stigma subsessile; upper lip small, ovate or shortly and broadly triangular; lower lip truncate, broad and short. Capsule globose, scarcely 1 lin. in diam. Seeds globose, smooth, $\frac{1}{8}$ lin. long, shining.—Hiern in Cat. Afr. Pl. Welw. i. 788; Kam. in Engl. Jahrb. xxxiii. 93, partly, and in Baum, Kunene-Samb. Exped. 372; Stapf in Hook. Ic. Pl. t. 2797, figs. 1–11.

Nile Land. Uganda: Nandi, *Scott-Elliot*, 7039!

Lower Guinea. Angola: Pungo Andongo; by the River Cuanza, near Sansamanda, *Welwitsch*, 262! by the Chitanda River, 4000 ft., *Baum*, 142!

Mozamb. Dist. Zanzibar: *Kirk!* British Central Africa: on an island in the Zambesi near the Victoria Falls, *Kirk!* Nyasaland: Tanganyika Plateau, 3000–4000 ft., *Whyte!*

Kirk's specimens from the Victoria Falls are much stunted, but they dissect in every respect like the slender typical form.

10. **U. Baumii,** *Kam. in Engl. Jahrb.* xxxiii. 102. A slender, twining annual. Rhizoids capillary, much-branched. Leaves decayed at the time of flowering, not known. Pitchers unknown. Scape filiform, twining, up to 1 ft. long; scales few, subulate, minute. Flowers 1–2, distant; bracts ovate, acute, 1 lin. long; bracteoles lanceolate to subulate, shorter than or as long as the bracts; pedicels

filiform, 7–10 lin. long, after flowering stiff-erect. Sepals subequal upper broadly elliptic-ovate, obtuse or subacute, over 2 lin. long, lower elliptic, obtuse. Corolla deep violet, 9–10 lin. long (from the tip of the upper lip to the end of the spur); upper lip panduriform, over 5 lin. long, of which $3\frac{1}{2}$–$3\frac{3}{4}$ lin. go to the ovate-orbicular part above the constriction; lower lip orbicular-cuneate, 4–5 lin. long; palate large, almost parallel to the upper lip, laterally compressed, almost triangular in side view and subacute at the upper angle, edge of mouth ciliolate, cilia gathered in a small tuft in front; spur slender, conic, acute, over 4 lin. long. Anthers over $\frac{1}{2}$ lin. long; pollen globose, with 4–5 short slits and pores; filament almost 1 lin. long, obovate-oblong. Pistil cylindric; stigma subsessile; upper lip obscure; lower short, broad, truncate. Capsule and fruit unknown.—Kam. in Baum, Kunene-Samb. Exped. 372. *U. reticulata*, Oliver in Journ. Linn. Soc. ix. 149; Hiern in Cat. Afr. Pl. Welw. i. 787, not of Smith.

Lower Guinea. Angola: Huilla; in bogs on the left bank of the Quipumpunhime River in the Humpata district, 4800 ft., very rare, *Welwitsch*, 265! by the Kuebe River, 3900 ft., *Baum*, 307!

This differs from the East Indian *U. reticulata* in the much larger upper lip and the very large subtriangular palate; and also in having a smaller calyx.

11. **U. prehensilis,** *E. Meyer, Comment. Pl. Afr. Austr.* i. 282. An annual, slender, terrestrial herb. Rhizoids filiform, whitish, brittle, loosely matted. Leaves scattered on the rhizoids, usually decayed at the time of flowering, linear-lanceolate or lingulate, obtuse, up to almost 1 in. long and up to 1 lin. broad, narrowed into a very slender petiole of about $\frac{1}{2}$ or $\frac{2}{3}$ of the length of the blade, thin. Pitchers numerous from the leaves and rhizoids, reversed with the mouth near the short stalk, globose or ovoid-globose, almost $\frac{1}{2}$ lin. in diam.; upper lip divided to the base into 2 horn-like curved segments; lower lip 0. Scape filiform, 3 in. to more than 1 ft. long, erect and more or less flexuous when short, twining when long; scales few, minute. Flowers 1–6, remote; bracts ovate to ovate-lanceolate, acute, over 1 lin. long; bracteoles lanceolate to subulate, as long as or shorter to much shorter than the bracts; pedicels filiform, 2–5 lin. long. Sepals membranous, somewhat dissimilar; upper ovate, acute or acuminate, many-nerved, in flower 2–$2\frac{1}{2}$ lin. long, in fruit up to 4 lin. long; lower usually shorter, more or less elliptic and obtuse. Corolla 6–8 lin. long (from the tip of the upper lip to the end of the spur), yellow; upper lip broadly oblong-spathulate with a rounded entire or emarginate tip, $2\frac{1}{2}$–4 lin. long; lower lip 3–4 lin. long, broadly ovate; palate erect almost parallel to the upper lip, with two large smooth anteriorly converging gibbosities passing into a minute toothed crest towards the corolla-mouth, which is ciliolate, the cilia joining in front in a more or less brush-like tuft; spur straight, descending, acute, 3–$4\frac{1}{2}$ lin. long. Anthers $\frac{1}{2}$ lin. long. Style short, stout, gradually passing into the ovary; upper lip of stigma very short and flat; lower depressed, rounded. Capsule ellipsoid, $2\frac{1}{2}$ lin. long. Seeds very obliquely ovoid, tubercled on the back, $\frac{1}{3}$–

almost $\frac{1}{2}$ lin. long.—DC. Prodr. viii. 20; Oliver in Journ. Linn. Soc. ix. 150, excl. var.; Hiern in Cat. Afr. Pl. Welw. i. 787; Kam. in Engl. Jahrb. xxxiii. 102, incl. vars. *huillensis*, *lingulata* and *hians*, and in Baum, Kunene-Samb. Exped. 373; Stapf in Dyer, Fl. Cap. iv. ii. 432, and in Hook. Ic. Pl. t. 2798. *U. madagascariensis*, A. DC. l.c. *U. hians*, A. DC. l.c. 25. *U. lingulata*, Baker in Journ. Linn. Soc. xx. 216; Baum, Kunene-Samb. Exped. 55.

Lower Guinea. Angola: Huilla; Humpata Plateau and in Morro de Lopollo, 5400 ft., *Wetwitsch*, 261! near the Kuebe River, 3900 ft., *Baum*, 303! by the Longa River, above the Quiriri River, 4160 ft., *Baum*, 691a!

Mozamb. Dist. German East Africa: Ubena; Liangiro swamp, *Goetze*, 799!

Also in Madagascar and Eastern South Africa.

Kamienski (l.c.) quotes what he considers the typical form from "Angola (Welwitsch, Iter angol. n. 261, Golungo)" and the variety *huillensis* from "Benguella (Welwitsch, Iter benguellense, n. 261, Dist. Huilla)." Specimens were actually distributed from Lisbon, with the inscription "Welw. Iter Angolense, 261, *Utricularia prehensilis*, E. Mey., Golungo Alto"; but there is no such label in Welwitsch's collection at the British Museum, and there is no doubt that n. 261 was collected in Huilla. Welwitsch describes (apparently from fresh material) the palate as deeply marked with four channels, and De Candolle speaks of 4 crests ("palato lamellis quatuor sursum exarato") in describing *U. hians*. I have not been able to make out the channels nor the crests in dried material.

12. **U. andongensis,** *Welw. ex Kam. in Engl. Jahrb.* xxxiii. 104. A delicate terrestrial annual growing in patches. Rhizoids filiform, branched, minutely glandular-verrucose. Leaves persistent at the time of flowering, in small rosettes of 3–6, linear, obtuse, narrowed at the base into a very short petiole, up to 15 lin. long and 1 lin. broad, frequently producing pitchers and rhizoids. Pitchers on the rhizoids and leaves, subglobose, $\frac{1}{4}$ lin. long, inverted; upper lip divided almost to the base into 2 slender horn-shaped tentacles, curved over the orifice. Scape filiform to capillary, flexuous, 2 to more than 4 in. high; scales very few and minute. Flowers 1 or 2, distant; bracts and bracteoles subequal, lanceolate, acuminate, $\frac{3}{4}$ lin. long; pedicel about 3 lin. long, capillary. Sepals broadly ovate in flower, upper larger than the lower, $1\frac{3}{4}$ to almost 2 lin. long, orbicular and acutely acuminate when ripe. Corolla yellowish, up to $4\frac{1}{2}$ lin. long (from the tip of the upper lip to the end of the spur); upper lip ovate-oblong, obtuse, slightly exceeding the upper sepal; lower lip orbicular, 2 lin. long, palate scarcely gibbous, smooth; spur conical, acute, $2\frac{1}{2}$ lin. long, straight or nearly so. Anthers slightly over $\frac{1}{4}$ lin. long; filaments filiform, $\frac{1}{2}$ lin. long. Stigma subsessile; upper lip indistinct; lower short, broad, truncate. Capsule and seeds unknown.—*U. prehensilis*, var. *parviflora*, Oliver in Journ. Linn. Soc. ix. 150. *U. tortilis*, var. *andongensis*, Kam. in Engl. Jahrb. xxxiii 104.

Lower Guinea. Gaboon: Sierra del Crystal; on rocks in rivers, *Mann*, 1684! Angola: Pungo Andongo; boggy places by the Casalate River, on the steep slopes of Pedra Songue, 3000 ft., *Welwitsch*, 264!

No doubt, more nearly allied to *U. tortilis* than to *U. prehensilis*; but sufficiently distinguishable by the persistent leaves, much broader and more conspicuously

acuminate sepals, larger corollas, with an ovate-oblong upper lip and filiform filaments.

13. **U. spiralis,** *Smith in Rees, Cyclop.* xxxvii. *no.* 5. An annual, delicate, terrestrial herb. Rhizoids much-branched; ultimate branchlets very short, glandular-verruculose. Leaves from the rhizoids, usually decayed at the time of flowering, spathulate-linear, obtuse, gradually attenuated into the slender petiole, up to over $\frac{1}{2}$ in. long and up to more than $\frac{1}{2}$ lin. broad. Pitchers from the rhizoids and the leaves, inverted with the mouth near the stalk, obovate-globose; upper lip divided to the base into 2 horn-like curved tentacles; lower lip 0. Scape filiform to subcapillary, up to 1 ft. long, usually twining round other plants; scales few, minute. Flowers 2–4, remote; bracts ovate-lanceolate, up to $\frac{3}{4}$ lin. long; bracteoles lanceolate to subulate, as long as or more commonly shorter than the bracts; pedicels very slender, up to 2 lin. long, with 2 wings near the tip gradually widening and passing into the calyx. Sepals unequal; upper ovate, acute to acuminate, $1\frac{1}{2}$ lin. long in flower, at length up to $2\frac{1}{2}$ lin. long; lower distinctly shorter, less acute to almost obtuse, both many-nerved. Corolla $2\frac{1}{2}$–3 lin. long (from the tip of the upper lip to the end of the spur), blue with a white spot at the palate; upper lip not or very slightly exceeding the upper sepal, shortly linear, truncate, not quite 1 lin. long; lower lip more or less erect, broadly obovate, rounded, up to 2 lin. long, palate convex, elliptic, white or yellowish with purple veins, with a tuft of minute hairs in front of the mouth; spur conic, acute, straight, descending, $1\frac{1}{2}$–2 lin. long. Anthers up to $\frac{1}{4}$ lin. long; filaments with a very broad convex wing on one side. Style short, but distinct; upper lip of stigma hardly any; lower subquadrate, truncate. Capsule globose-ellipsoid, up to $1\frac{1}{2}$ lin. long. Seeds globose, about $\frac{1}{6}$ lin. in diam.; testa reticulate, areoles nearly isodiametric; embryo globose, not differentiated.—Oliver in Journ. Linn. Soc. ix. 149; Kam. in Engl. Jahrb. xxxiii. 102. *U. cærulea,* Oliver, l.c., not of Linn. *U. uliginoides,* Kam. l.c. 101, not of Wight.

Upper Guinea. Sierre Leone: Scarcies Valley, near Kitchom; *Scott-Elliot,* 4342! and without precise locality, *Afzelius!* Lagos Island, *Barter,* 20214!

Smith described the lower lip as "cloven." He must have examined a flower with a torn or split lower lip, as it is certainly entire. A. De Candolle, who did not see any specimens, renders "cloven" with "trilobum," which is equally wrong. *U. spiralis* is extremely similar to weak specimens of *U. uliginoides,* Wight, which is quite distinct from *U. cærulea,* Linn., as originally understood by Linnæus (see Smith in Rees, l.c. no. 47), but differs from it in somewhat smaller flowers, with a large white palate, very broadly winged filaments, and a testa with almost isodiametric (not elongated) areoles, and as it seems very much smaller leaves.

14. **U. Schweinfurthii,** *Baker MSS.* A very delicate, twining annual. Rhizoids and leaves unknown. Scape capillary, twining round other plants, simple or sparingly branched, up to more than $\frac{1}{2}$ ft. long; scales very minute, few. Flowers few to six, distant; bracts and bracteoles under $\frac{1}{2}$ lin. long, lanceolate, subequal; pedicels very slender, up to $4\frac{1}{2}$ lin. long, obscurely winged near the tip. Sepals unequal; upper ovate, acuminate, slightly over 1 lin. long in flower, nearly up to

2 lin. long in fruit; lower ovate-elliptic, acute, somewhat shorter than the upper, both scarious in fruit, about 7-nerved. Corolla about 3 lin. long (from the tip of the upper lip to the end of the spur), pale purplish (?); upper lip oblong, obtuse, scarcely exceeding the upper sepal, slightly over 1 lin. long; lower lip orbicular-cuneate, over $1\frac{1}{2}$ lin. long; palate erect, with 2 short distinct gibbosities and a minute tuft of hairs in front of the mouth; spur conic-subulate, straight or slightly curved, slender, up to $2\frac{1}{2}$ lin. long. Anthers over $\frac{1}{4}$ lin. long; filaments linear. Style obscure; upper stigmatic lip quite obscure; lower quadrate-rotundate. Capsule broad-ellipsoid, 1–$1\frac{1}{4}$ lin. long. Seeds ovoid to ellipsoid, $\frac{1}{5}$ lin. long, smooth; cells of testa distinctly elongate.

Nile Land. Bongo: Gir, *Schweinfurth*, 2514!

15. **U. tortilis,** *Welw. ex Oliver in Journ. Linn. Soc.* ix. 150. A delicate, terrestrial annual. Rhizoids filiform, much branched, minutely glandular-verrucose. Leaves unknown, decayed at the time of flowering. Pitchers on the rhizoids, ovoid-globose, inverted, $\frac{1}{3}$ lin. long; upper lip divided to the base into 2 narrow horn-shaped tentacles, curved over the small orifice; lower lip 0. Scape subcapillary, twining, 3 in. high; scales very few and very minute. Flowers usually 1, subterminal or up to 4; bracts ovate, $\frac{3}{4}$ lin. long; bracteoles oblong, much smaller than the bracts; pedicel filiform, about 1–$1\frac{1}{2}$ lin. long. Sepals subequal, ovate-elliptic to elliptic, obtuse or acutely acuminate, $\frac{1}{2}$ lin. long. Corolla yellowish, $2\frac{1}{2}$–3 lin. long (from the tip of the upper lip to the end of the spur); upper lip subquadrate, entire, not or scarcely exceeding the upper sepal, with purple longitudinal streaks; lower lip suborbicular, entire, slightly over 1 lin. long, palate slightly gibbous, deep yellow, edge of mouth ciliolate, cilia joining in a small beard in front; spur obliquely conic with a broad base, $1\frac{1}{2}$ lin. long. Anthers $\frac{1}{4}$ lin. long; pollen with about 4 slits and very minute pores; filaments $\frac{1}{2}$ lin. long, more or less winged. Stigma subsessile; upper lip indistinct; lower very broad and short. Capsule and seeds unknown.—Kam. in Engl. Jahrb. xxxiii. 104 excl. var.

Lower Guinea. Angola: Huilla; near Moro de Lopollo, in bogs among short grass and sedges, associated with mucilaginous Algæ, 5500 ft., *Welwitsch*, 258!

16. **U. micropetala,** *Smith in Rees, Cyclop.* xxxvii. *no.* 58. An annual, delicate terrestrial herb. Rhizoids capillary. Leaves mostly decayed at the time of flowering, scattered on the rhizoids, very narrow linear, obtuse, very gradually attenuated into the petiole, with it $2\frac{1}{2}$ lin. long, $\frac{1}{6}$ lin. broad (only one leaf seen). Pitchers unknown. Scape filiform to capillary, erect or subflexuous, simple, up to 4 in. high; scales few, very minute. Flowers 2–3, remote; bracts ovate, acute, $\frac{1}{2}$ lin. long; bracteoles subulate, shorter than the bracts; pedicels slender, with 2 narrow gradually widening wings near the tip, about 2 lin. long. Sepals ovate, somewhat unequal, closely nerved; upper larger, $1\frac{1}{2}$–2 lin. long, acuminate; lower acute. Corolla 5 lin. long (from the tip of the upper lip to the end of the spur), yellow; upper lip ovate, entire, 1 lin. long; lower lip subquadrate, undulate, 1 lin.

long; palate flat, edge of the mouth ciliolate and with a small tuft of hairs in the front; spur conic, about $3\frac{1}{2}$ lin. long and up to $1\frac{1}{2}$ lin. wide. Style distinct. Immature capsule ellipsoid.—DC. Prodr. viii. 19; Oliver in Journ. Linn. Soc. ix. 151; Kam. in Engl. Jahrb. xxxiii. 101. *U. cucullata* and *U. inflata*, Afzel. MSS., according to Kamienski.

Upper Guinea. Sierra Leone, *Afzelius!*

17. **U. Mannii,** *Oliver in Journ. Linn. Soc.* ix. 149. A dwarf, delicate, terrestrial, tuberous perennial; tuber globose, about 2 lin. in diam., producing a filiform erect scape from the base of which spring a solitary leaf and several rhizoids; rhizoids subverticillate, 2 approximately on a level with the leaf and 3 in a whorl close above them, finely filiform, simple or sparingly branched. Leaf ligulate or spathulate, obtuse, long attenuated into a slender petiole of about the same length as the blade, which is about 1 in. long and up to 2 lin. broad. Pitchers few, on the rhizoids, inverted, ovoid to subglobose, slightly over $\frac{1}{4}$ lin. long; upper lip divided to the base into 2 linear or horn-shaped tentacles more or less recurved over the narrow orifice; lower lip 0. Scape 3–$3\frac{1}{2}$ in. long; scales few to about 7, subulate, up to 1 lin. long. Flowers 1–2; bracts and bracteoles subequal, subulate, 1 lin. long; pedicel filiform, up to $3\frac{1}{2}$ lin. long, at length deflexed. Sepals very unequal; upper narrowly ovate, acute, up to $2\frac{1}{2}$ lin. long; lower elliptic, obtuse, $1\frac{1}{2}$ lin. long. Corolla not seen in a perfect condition; upper lip (according to *Oliver*) erect, suboblong, obtuse, entire, slightly exceeding the upper sepal; lower lip (according to *Oliver*) flabelliform-cuneate, entire; spur conic, obtuse, descending, $2\frac{1}{2}$ lin. long. Anthers $\frac{1}{3}$ lin. long; filaments linear, $\frac{1}{2}$ lin. long. Pollen depressed-globose, with only 3 pores. Stigmas subsessile; upper lip very short and broad; lower lip truncate.—Kam. in Engl. Jahrb. xxxiii. 101. *U.* sp., Hook. f. in Journ. Linn. Soc. vii. 209.

Upper Guinea. Cameroons: Cameroon Peak, 4000–6000 ft., *Mann*, 212! Evidently very closely allied to *U. bryophila.*

18. **U. bryophila,** *Ridley in Ann. Bot.* ii. 306. A dwarf, delicate, epiphytic, tuberous perennial. Tuber globose, about 2 lin. in diam., producing one or two filiform erect scapes, from the base of which spring a solitary leaf and several rhizoids. Rhizoids subverticillate, long, simple or with few very short branches. Leaf lanceolate, or narrowed from below the middle and linear to the upper part, obtuse, cuneate at the base; blade up to $\frac{3}{4}$ in. long and to $1\frac{3}{4}$ lin. broad; petiole 2–3 lin. long, very slender. Pitchers numerous, along the rhizoids, globose-ovoid, inverted, slightly over $\frac{1}{4}$ lin. long; upper lip deeply divided into 2 short horn-shaped tentacles curving over the narrow orifice; lower lip 0. Scape over 1 in. long; scales 5–8, subulate, $\frac{1}{2}$ lin. long. Flowers solitary; bracts and bracteoles subequal, subulate, $\frac{1}{2}$–$\frac{3}{4}$ lin. long; pedicel filiform, $2\frac{1}{2}$–4 lin. long. Sepals very unequal; upper narrowly ovate, acute, over 2 lin. long; lower oblong-elliptic, obtuse, $1\frac{1}{2}$ lin. long. Corolla over 6 lin. long (from the tip of the upper lip to the end of the spur); upper lip ovate, bifid over 4 lin.

long, lobes narrow, acute; lower lip parallel to the upper, 3-lobed, about 7 lin. long, base cuneate, side lobes short, broad, subacute, middle lobe triangular-lanceolate, much longer than the side lobes; spur conic, obtuse, more or less curved upwards, $2\frac{1}{2}$ lin. long. Anthers $\frac{1}{3}$ lin. long; filaments filiform, over $\frac{1}{2}$ lin. long; pollen globose, with 3 pores. Style short, but distinct; upper lip very short and broad; lower lip truncate, very broad. Capsule and seeds unknown.—Kam. in Engl. Jahrb. xxxiii. 106.

Lower Guinea. Island of St. Thomas: in moss on trees, 1300 ft., *Moller!*

19. **U. subulata,** *Linn. Sp. Pl. ed.* i. 18. A delicate, dwarf sub-terrestrial herb, 3–4 in. high. Stolons in pseudo-whorls from the base of the scape, descending, stiff and somewhat thickened at the base, then filiform to very finely capillary and flexuous, from a few to 9 lin. long, branched; branches short, finely capillary with one or several branchlets; branchlets frequently replaced by bladders. Leaves in small rosettes at the base of the scapes (below the stolons), with a narrow linear-lanceolate blade, up to $2\frac{1}{2}$ lin. long and $\frac{1}{4}$ lin. broad and a filiform petiole of the same length, or more or less filiform. Bladders on the stolons, rarely on the leaves, ovoid, $\frac{1}{6}$–$\frac{1}{4}$ lin. long, mouth small, oblique, subopposite to the stalk, with a pair of staghorn-shaped antennæ. Scape filiform, straight, simple, with very few minute adpressed peltate scales, 6–2- (rarely 1-) flowered; axis of inflorescence often flexuous or zig-zag; bracts peltate, about $\frac{1}{2}$ lin. long, membranous, upper half acute, lower rounded, bracteoles 0; pedicels very fine, up to $4\frac{1}{2}$ lin. long. Sepals broad-elliptic to orbicular; upper about $\frac{3}{4}$ lin. long; lower slightly shorter, in the fruit prominently striate. Corolla yellow, $2\frac{1}{2}$ lin. long; upper lip broad-ovate, about $1\frac{1}{4}$ lin. long, entire; lower lip $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, 3-lobed; middle lobe much longer than the lateral, ovate; palate much raised, truncate or slightly emarginate in front view, minutely papillose; spur conic to cylindric, very wide, obtuse, 2–3 lin. long. Filaments linear from a broader base, $\frac{1}{3}$ lin. long; anthers $\frac{1}{8}$ lin. in diam; pollen very small. Stigma sessile on the globose ovary; upper lip ovate-oblong, much smaller than the large depressed-orbicular lower lip. Capsule globose, up to 1 lin. in diam.; seeds globose-ellipsoid, $\frac{1}{8}$ lin. long; testa smooth, longitudinally striate; embryo undifferentiated, of the same shape as the seed.—DC. Prodr. viii. 16; Benj. in Mart. Fl. Bras. x. 243; Oliv. in Journ. Linn. Soc. ix. 148; Hiern in Cat. Afr. Pl. Welw. i. 786; Kam. in Engl. Jahrb. xxiii. 105 (incl. vars. *inæqualis* and *minuta*).

Upper Guinea. Sierra Leone: west side of St. George's Water, near Freetown, *Johnston*, 18! and without precise locality, *Smeathmann! Afzelius!* Liberia: Grand Bassa, *Dinklage*, 1727 (ex *Kamienski*). Lagos Island, *Barter*, 20213!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2559!

Lower Guinea. Lower Congo: near Leopoldville, *Duchesne*, 44; Stanley Pool, *Schlechter*, 12580; and without precise locality, *Gillet*, 1; *Dewèvre*, 1082 (all ex *Kamienski*). Angola: Humpata; Empalanca Plains, 5500 ft., *Welwitsch*, 257! German South-west Africa: Hereroland; Waterberg, *Dinter*, 352.

South Central. Congo Free State: between Lukolela and Agusto, *Büttner*, 467.

Mozamb. Dist. Zanzibar, *Kirk!* Portuguese East Africa: Beira, *Schlechter*, 12174 (ex *Kamienski*).

Widely spread through tropical South and Central America, the West Indies and the Eastern United States. I am not able to distinguish *U. pusilla*, Vahl, from *U. subulata*, particularly from the form, known as *U. subulata*, var. *inæqualis*, DC., and assume that the plant enumerated by Kamienski, l.c. 105, under *U. subulata* from Dolo in the Congo Free State (Schlechter, 12456) also is *U. subulata*.

20. **U. striatula,** *Smith in Rees, Cycl.* xxxvii. *no.* 17. A dwarf, delicate, terrestrial herb. Stolons finely filiform, up to more than 1 in. long, creeping among moss, bearing leaves and bladders, sometimes forming minute tubercles. Leaves scattered along the stolons and usually in small rosettes at the base of the scapes; blades more or less orbicular, rarely over 1 lin. in diam.; petiole as long as or shorter than the blade. Bladders only from the stolons, obliquely ovoid, up to $\frac{1}{2}$ lin. long, stalk and mouth lateral, approximate, mouth with 2 fimbriate oblong antennæ. Scape finely filiform, 1–6 in. long, straight or flexuous, with very few or no peltate ovate-lanceolate scales, few- to 10-flowered; bracts about $\frac{3}{4}$ lin. long, like the scales, attached much below the middle; bracteoles 2, oblong-lanceolate, somewhat shorter than the bracts; pedicels capillary, 2–$2\frac{1}{2}$ lin. long. Sepals very unequal, more or less orbicular; upper at length up to $1\frac{1}{2}$ lin. long and adnate to the capsule; lower $\frac{1}{2}$ lin. long, reflexed. Corolla rose-coloured with a yellow palate, $2\frac{1}{2}$–3 lin. long; upper lip suborbicular, emarginate, rather broader than long, 1 lin. high; lower lip semi-orbicular, 5-lobed, $2\frac{1}{2}$–3 lin. long, spreading; palate slightly gibbous, papillose; spur subulate, up to $2\frac{1}{2}$ lin. long, deflexed. Filaments filiform, $\frac{1}{4}$ lin. long; anthers oblong, $\frac{1}{4}$ lin. long; pollen subglobose, with 4 (always ?) minute pores. Stigma subsessile; upper lip scarcely any; lower rotundate. Capsule subglobose, opening laterally near the base with a wide slit; pericarp very thin, transparent. Seeds oblong-ellipsoid, $\frac{1}{7}$–$\frac{1}{8}$ lin. long, elegantly glochidiate; embryo with two obscure swellings at the top.—*U. orbiculata*, Wall. Cat. 1500; DC. Prodr. viii. 18; Clarke in Hook. f. Fl. Brit. India, iv. 334; Oliver in Journ. Linn. Soc. iii. 187, ix. 156; Kam. in Engl. Jahrb. xxxiii. 106; Goebel in Ann. Jard. Buitenz. ix. 53–60, figs. 28–36 and 68–70. *U. glochidiata*, Wight, Ic. t. 1581.

Upper Guinea. Sierra Leone: near Regent, *Scott-Elliot*, 3965! and without precise locality, *Afzelius!* Cameroons: Cameroon Peak, 5000 ft., *Mann*, 1964! near Buea, epiphytic on *Elæis guineensis*, 3100 ft., *Preuss*.

Mozamb. Dist. German East Africa, *Hannington!*

Throughout India and in the Malay Archipelago. There can be no doubt as to the identity of the African and Indian plants.

21. **U. rigida,** *Benjamin in Linnæa*, xx. 303. A small aquatic attached herb. Stolons filiform, up to $\frac{1}{2}$ lin. thick, branched; branches up to 9 in. long, slender, very flexible, floating in swift water, bearing leaves and inflorescences, or leafless. Rhizoids from the base of the scapes, short, thick, cylindric, minutely glandular, sensitive, acting like

tendrils or adhesive roots and fixing the plant to the substratum. Leaves pinnatifid, up to ½ in. long, articulate at the base; segments capillary, simple or bifid, minutely glandular. Bladders 0. Scapes from a few inches to nearly 1 ft. long, rigid or more or less flexuous, slender to more than ½ lin. in diam., simple or sparingly branched, 5- to many-flowered, with or without scales resembling the bracts; bracts rotundate, up to 1 lin. long; bracteoles linear, ½ lin. long; pedicels 1 or at length up to 2 lin. long, slender, suberect. Sepals very unequal; upper rotundate, 1 lin. long; lower elliptic-orbicular, up to over ½ lin. long. Corolla (according to *Oliver* and *Benjamin*) 1¼ lin. long; upper lip ovate-rotundate, obtuse, entire, ¾–1 lin. long; lower lip slightly longer than the upper, 2-lobed, lobes obtuse; spur reduced to a slight sac-like bulging. Filaments filiform from a broad base; anthers orbicular, ⅛ lin. in diam.; pollen very small, with 4 fine longitudinal grooves. Stigma sessile; upper lip 0; lower depressed-orbicular, large. Capsule globose, 1 lin. in diam., faintly 4-ridged; seeds obliquely ellipsoid, $\frac{1}{10}$–⅛ lin. long, exuding a coat of mucilage when wetted.—Oliver in Journ. Linn. Soc. ix. 148; Kam. in Engl. Jahrb. xxxiii. 106. *U. suaveolens*, Afz. ex Benj. l.c.

Upper Guinea. Senegambia: on rocks in swift currents of water near Fouta Jallon, *Heudelot*, 710! Sierra Leone: Sugarloaf Mountain, near Freetown, *Barter!* stream near Franziga, *Scott-Elliot*, 4736! and without precise locality, *Afzelius! Smeathman!*

A very remarkable species, resembling in habit the genera *Quartinia* (*Lythrarieæ*) and *Angolæa* (*Podostemaceæ*) which grow under similar conditions. It is nearly allied to *U. neottioides*, a native of Brazil.

22. **U. Thonningii,** *Schumach. in Schumach. & Thonn. Beskr. Guin. Pl.* 12. A submerged, aquatic herb floating close to the surface. Stems up to over 1 ft. long, filiform to more than ½ lin. in diam. Leaves heteromorphic; normal leaves from a few lines to more than ½ in. apart, rarely subopposite, 3–6-partite, auricled, rays up to 1½ in. long, finely filiform or dilated and up to over 1 lin. broad, auricles solitary or paired, adpressed to the axis, orbicular-cordate to reniform with a narrow sinus, 3–4 lin. across, hyaline, delicately ciliate-dentate; pinnæ up to 4 lin. long, usually furcate from near the base, ultimate segments capillary, minutely setose, with or without bladders; bladders usually solitary, from the lower part of a pinna, obliquely globose-ovoid, ¾–½ lin. in diam., mouth lateral, truncate, oblong, naked or (according to *Kamienski*) with 2 setiform antennæ; float leaves in a false whorl of 6 (rarely fewer or more) or irregularly approximate, 1¼–2½ in. below the lowest flower, linear-oblong to oblong in outline, terete, 10–12 lin. long, 1½–2½ lin. in diam., with short or long pinnæ near the apex. Raceme few- to many-flowered; peduncle below the floats 2–4 in. long or occasionally very short, slender; bracts broad-ovate, obtuse, up to almost 1 lin. long; bracteoles 0; pedicels 1–1½ lin. long, filiform and obliquely erect when in flower, then spreading or recurved, with gradually widening wings passing into the wide base of the mature calyx. Sepals suborbicular-ovate or orbicular, obtuse, upper almost 2 lin., lower

almost 1½ lin. long, much enlarged in the fruit, up to 6 lin. in diam. Corolla yellow or white with purple veins (according to *Thonning*), 3–3½ lin. long; upper lip broad-ovate, 2 lin. long, obtuse, entire; lower lip rotundate-subquadrate, 2½ lin. long; palate very large and gibbous; spur cylindric, obtuse, adpressed to the lower lip, up to 2½ lin. long. Anthers patelliform when open, ⅜ lin. long. Ovary globose; style distinct, but very short; upper lip obscure; lower large, rotundate. Capsule globose, 2–2½ lin. in diam., enveloped by the compressed enlarged calyx; seeds short, prismatic, 4–5-angular, up to ¼ lin. in diam. and almost as high, all the angles marginate. Embryo slightly concave on the top face.—*U. inflexa*, Vahl, Enum. i. 196 (Thonning's description and plant); DC. Prodr. viii. 4, partly; Oliver in Trans. Linn. Soc. xxix. 123; Kam. in Engl. Jahrb. xxxiii. 108, partly, not of Forsk. *U. Oliveri*, Kam. in Ber. Deutsch. Bot. Gesellsch. 1894, 4, and in Engl. Jahrb. l.c. (including var. *Schweinfurthi*).

Upper Guinea. Northern Nigeria: Nupe; in lakes and swamps, *Barter*, 1039! Gold Coast: in stagnant water, *Thonning!* Cape Coast, *Brass!*

Nile Land. Kordofan: Lake Tura and Omkenen; Arashkol Mountain, *Kotschy*, 201! *Steudner*, 1455! White Nile, *Petherick!* Bahr el Gebel, *Schweinfurth*, iii., 226! *Broun*, 30! Uganda: Unyoro; in the Nile, *Grant*, 2!

Mozamb. Dist. Zanzibar. *Hildebrandt*, 976! German East Africa: Lake Nyasa, Kambwe Lagoon and in the River Rombashi, *Laws!* Portuguese East Africa: Quaqua River, near Quilimane, *Menyharth!* British Central Africa: Lake Tanganyika, at the mouth of the Lufu River, *Cunnington*, 33! Domira Bay, Lake Nyasa, *Cunnington*, 579!

Var. *laciniata*, Stapf. Auricles more or less deeply laciniate, laciniæ hyaline like the body of the auricles, minutely setulose. Corolla up to 4 lin. long. Seeds as in the typical form or not so high; embryo sometimes bright sea-green.

Mozamb. Dist. German East Africa: Zanguebar, *Kirk*, 5!

M. Thonningii differs, so far as herbarium specimens go, from *U. inflexa*, Forsk., only in the presence of large hyaline auricles. Grant and Barter describe the colour of the corolla as yellow, but Thonning as white with purple streaks, which is the usual colour of the flowers of *M. inflexa*. On the other hand, there is a specimen of *U. inflexa* at Kew, collected by Figari in Lower Egypt, with the collector's note "var. flore luteo." Kamienski quotes numerous specimens of *U. inflexa* from Tropical Africa; those which I have had an opportunity of examining, possessed the characteristic stipules of *E. Thonningii*. As the auricles are easily overlooked in badly dried specimens, or break up and at length rub off, they may have escaped Kamienski's notice. In fact, the author quotes two of the specimens, enumerated under *U. inflexa*, also under *U. Oliveri*, viz. Kotschy, 201 and Barter, 3243. I have seen no specimens of *U. Thonningii* from outside of Tropical Africa.

23. **U. trichoschiza,** *Stapf.* A submerged, aquatic herb floating close to the surface. Stems up to over 1½ ft. long, filiform, very slender. Leaves heteromorphic; normal leaves from a few lines to ½ in. apart, rarely subopposite, 3–6-partite, auricled, rays up to 1⅔ in. long, filiform to ½ lin. broad; auricles solitary or paired, orbicular-cordate to reniform in outline, 3–5 lin. across, cut up to beyond the middle into very numerous filiform, flexuous minutely setulose segments, very thin and hyaline; pinnæ up to 9 lin. long, usually furcate from near the base, ultimate segments finely capillary, sparsely and minutely setulose, with or without bladders; bladders usually solitary from the lower part of a

pinna, globose-ovoid, up to $\frac{3}{4}$ lin. in diam., mouth lateral, truncate, oblong, naked (always ?); float leaves in a false whorl of 3–6, $\frac{1}{2}$–$1\frac{1}{3}$ in. below the lowest flower, oblong, terete, 5–7 lin. long, $2\frac{1}{2}$ lin. in diam., with minute pinnæ at the frequently deeply constricted apex. Raceme 4–10-flowered; peduncle below the floats $\frac{1}{2}$–$1\frac{2}{3}$ in. long, very slender; bracts broad-oblong, 1–$1\frac{1}{2}$ lin. long, obtuse, soon deciduous; bracteoles 0; pedicels up to $1\frac{1}{2}$ lin. long, filiform, obliquely erect in flower, finely recurved, more or less widened at the very apex in fruit. Sepals orbicular to orbicular-ovate, obtuse, subequal, scarcely more than 1 lin. long, shortly decurrent and enlarged in fruit. Corolla 2–$2\frac{1}{3}$ lin. long; upper lip ovate, $1\frac{1}{4}$ lin. long, obtuse, entire; lower lip rotundate, $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long; palate large, 2-gibbous, minutely papillose; spur cylindric from a broad, suddenly constricted base, obliquely truncate, slightly exceeding the lower lip. Mature fruit unknown.—*U. Oliveri*, var. *fimbriata*, Kam. in Ber. Deutsch. Bot. Gesellsch. 1894, 4, and in Engl. Jahrb. xxxiii. 108.

Upper Guinea. Lagos: Yoruba, *Millson!* Southern Nigeria: Old Calabar River, *Mann*, 2326!

The specimen from which Kamienski described his *U. Oliveri*, var. *fimbriata*, was collected by Buchholz on Eliva (Lake) Sile, on the Lower Ogowe. I have not seen it, but, from the description, it is very probably identical with my *U. trichoschiza*.

24. **U. stellaris,** *Linn. f. Suppl.* 86. A submerged, aquatic herb floating near the surface. Stems up to over 1 ft. long, filiform to more than $\frac{1}{2}$ lin. in diam. Leaves heteromorphic, normal leaves from a few lines to more than $\frac{1}{2}$ in. apart, rarely subopposite, 4–6-partite, usually auricled; rays $\frac{1}{2}$–$1\frac{1}{2}$ in. long, finely filiform to linear (up to more than $\frac{1}{2}$ lin. broad), auricles orbicular-cordate in outline, 1–$2\frac{1}{2}$ lin. in diam., fringed or deeply and repeatedly divided, fringes or segments finely subulate and rather rigid, rigidly ciliate with the cilia often 2–3-nate, or the segments in cases of extreme division running out into capillary flexuous tips resembling the ultimate segments of the typical leaf-pinnæ; pinnæ 2–5 lin. long, usually furcate from or near the base, ultimate segments capillary, minutely setose, with or without bladders; bladders from the angles of the divisions, 1 or 2 with each pinna, obliquely globose-ovoid, $\frac{3}{4}$–1 lin. in diam., mouth truncate, oblong, naked (always ?), almost closed by a flexible valve in the upper and the thickening of the rim in the lower part; floats in a false whorl of 4–6 (rarely fewer or more), usually 3–6 lin. below the lowest flower, broad-ellipsoid to ovoid, $2\frac{1}{2}$–4 lin. long with some reduced short pinnæ near the apex. Raceme few- to 12-flowered; peduncle 1–9 in. long, slender; bracts broadly-ovate, obtuse, $\frac{3}{4}$–1 lin. long; bracteoles 0; pedicels 1–$1\frac{1}{2}$ lin. (rarely more) long, filiform and obliquely erect during flowering, then gradually recurving, at last up to 3 in. long and more or less widened below the calyx. Sepals subequal, ovate-orbicular or orbicular, subobtuse to rounded, 1–$1\frac{1}{2}$ lin. long. Corolla yellow, 2–$2\frac{1}{2}$ lin. long; upper lip rotundate-ovate, up to $1\frac{1}{2}$ lin. long; lower lip sub-quadrate up to over 2 lin. long; palate very large and gibbous; spur subcylindric, obtuse, adpressed to the lower lip, up to 2 lin. long.

Anthers patelliform when open, $\frac{1}{6}$ lin. in diam., cells confluent; filaments filiform, narrowly winged, $\frac{3}{8}$ lin. long. Ovary globose; style distinct, short; lower stigmatic lips truncate-rotundate, upper lip 0. Capsule globose, 2–2½ lin. in diam. Seeds box-shaped, 4–5-angular, $\frac{1}{5}$–$\frac{3}{8}$ lin. across, $\frac{1}{8}$–$\frac{1}{10}$ lin. high, all the angles more or less narrowly winged, top-face finely reticulate. Embryo not differentiated.—Roxb. Coromand. Pl. ii. 42, t. 180, Fl. Ind. i. 143; Wight in Hook. Bot. Misc. iii. 91; Ic. Pl. iv. t. 1567; E. Meyer, Comm. Pl. Afr. Austr. 281; DC. Prodr. viii. 3 (incl. var. *coromandeliana*); Oliver in Journ. Linn. Soc. iii. 174, and ix. 146; Hiern in Cat. Afr. Pl. Welw. i. 785, partly; Kam. in Engl. Jahrb. xxxiii. 107 (incl. vars. *dilatata*, *filiformis* and *breviscapa*); Stapf in Dyer, Fl. Cap. iv. ii. 433.

Upper Guinea. Senegambia: by the Senegal River, *Roger! Perrottet*, 595! 617! *Leprieur!* French Guinea: Farana, on the River Niger, *Scott-Elliot*, 5360! Northern Nigeria: Nupe, *Barter*, 1553! Bornu; north of Mora, in Mandara, *Vogel!*

Nile Land. Kordofan: Omkenen, *Steudner*, 1456! in a lake at the foot of Arashkol Mountain, *Kotschy*, 202! Jur: near Wau, *Heuglin*, 33! Bongo: Gir, *Schweinfurth*, 2150! Uganda: Lake Victoria, near Entebbe, *Cunnigton*, 620!

Lower Guinea. Angola: Icolo e Bongo; in Lake Funda, on the left bank of the Bengo River, *Welwitsch*, 268! Lake Quilunda, near Prato, *Welwitsch*, 286*b*! Barra do Dande; in the River Dande, *Welwitsch*, 286*c*! in lakes by the Lifume River, near Banza de Libongo, *Welwitsch*, 268*d*! Mossamedes; by the Cunene River, near Humbe, 3700 ft., *Baum*, 104! German South-west Africa: Amboland; Olukonda, *Schinz*, 402! *Rautanen*, 483! Hereroland; Om na Matako, *Schinz*, 400! Ompoatyipiro, *Dinter*, 515! by the Cunene River, near Kileri, *Schinz!*

Mozamb. Dist. Portuguese East Africa: Quaqua River, near Quilimane, *Menyharth!* "Zambesiland," *Kirk!* Lower Zambesi; near Shigogo, *Kirk!* Lupata, *Kirk!* below Lupata, *Kirk!* British Central Africa: Catumba Country, *Nicholson!* Bechuanaland; Bitterpits, west of Lake Ngami, *Schinz*, 401!

Also in South Africa, Madagascar, India, and tropical Australia.

25. **U. villosula,** *Stapf.* A submerged, aquatic herb floating close to the surface. Stems filiform, very slender, almost villous from extremely fine spreading hairs. Leaves heteromorphic; normal leaves from a line to more than 1 in. apart, simple or of 2–3 rays, not auricled, rays 5 to 8 lin. long, finely filiform and repeatedly divided from 1–2½ lin. above the base or inflated and spindle-shaped up to the middle and multifid above, delicately villous in the lower part; ultimate segments capillary, very sparsely and minutely setulose, with or without bladders; bladders 1 or few on a pinna, obliquely globose-ovoid, ½ lin. in diam., mouth sublateral, oblique, oblong, delicately fimbriate; float leaves 5–6 in a whorl, lanceolate-oblong in outline, terete, attenuated into a short stalk, 4–6 lin. long, up to 1½ lin. in diam., with short multifid sometimes bladder-bearing pinnæ near the apex. Racemes terminal at the end of stems bearing foliage- and float-leaves, 4–2-flowered, the uppermost 2–3 flowers rather close, the 3rd or 4th (if present) about 1½ in. below them; peduncle very slender, glabrous, about 1¼ in. long to the lowest flower, without scales; bracts ovate, nerveless, scarcely ½ lin. long; bracteoles 0; pedicels filiform, 1½–2 lin. long, suberect also in fruit. Sepals subequal, ovate-orbicular to depressed-orbicular, ½ lin.

long, slightly larger in fruit. Corolla lilac with a violet mark on the palate, 4–5 lin. long; upper lip ovate, 2-lobed to the middle, $1\frac{1}{2}$ lin. long, lobes obtuse; lower lip reniform-orbicular, $2\frac{1}{2}$ lin. long, 4 lin. broad, sides turned up; palate rather flat with 2 slight papillose gibbosities; spur cylindric, obtuse, $3\frac{1}{2}$–$4\frac{1}{2}$ lin. long, almost $1\frac{1}{2}$ lin. in diam., obtuse, slightly curved upwards. Anthers $\frac{1}{4}$ lin. in diam.; filaments filiform, $\frac{1}{2}$ lin. long. Style distinct, over $\frac{1}{4}$ lin. in the fruit; upper stigmatic lip obscure; lower ovate, large. Capsule globose, 1 lin. in diam.; seeds subprismatic, more or less 4–5-angular, about $\frac{1}{5}$ lin. in diam., $\frac{1}{20}$ lin. high, angles narrowly winged; testa reticulate. Embryo slightly concave on the top face.—*U. benjaminiana*, Kam. in Engl. Jahrb. xxxiii. 109, and in Baum, Kunene-Samb. Exped. 373, not of Oliv.

Lower Guinea. Angola: Mossamedes; by the Longa River, near Minnesera, 4160 ft., *Baum*, 656 !

The American *U. benjaminiana*, Oliv., is closely allied to *U. villosula*, but has longer and much narrower floats, and smaller flowers (up to 3 lin. long), of which there are often as many as 10 in an inflorescence, borne on short pedicels (1–$1\frac{1}{2}$ lin. long).

26. **U. foliosa,** *Linn. Sp. Pl. ed.* ii. 26. An aquatic, floating herb. Stolons up to several yards long, 1–$1\frac{1}{2}$ lin. thick, giving off at intervals of 2 or more inches solitary or fascicled branches; branches spreading up to over 1 foot long, densely or loosely leafy except towards the base. Leaves all of one kind or only differing in the presence or absence of bladders, alternate, up to 3 in. long, compound-pinnate, lowest pinna at or near the base; ultimate segments capillary, sparsely and minutely setose, primary (rarely also the secondary) midribs occasionally dilated and spongy. Bladders very numerous on some (in extreme cases most of the segments replaced by bladders), sparse or 0 on other leaves, subobliquely globose, $\frac{1}{2}$–$\frac{3}{4}$ lin. in diam., mouth truncate with a few long branched delicate cilia. Raceme up to 12-flowered; peduncle rising from the branch-fascicles, $\frac{1}{4}$ to over 1 ft. long, slender or sometimes inflated; bracts elliptic or ovate, obtuse or subacute, $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long, membranous, adpressed to the pedicel, lowest 1–3 barren; bracteoles 0; pedicels filiform, $2\frac{1}{2}$–5 lin. long (in the African specimens), obliquely erect during flowering, then gradually recurving and slightly lengthening, not thickened upwards. Sepals broad-ovate, connate at the base, obtuse or subacute, $1\frac{1}{2}$–2 lin. long, membranous, scarcely enlarging after flowering. Corolla yellow, 5–8 lin. long; upper lip rotundate-ovate, 2–3 lin. long; lower lip broad, suborbicular, submarginate, 4–5 lin. long, adpressed to, and as long as, the lower lip, often minutely 2-lobed. Filaments curved, wider upwards, 1 lin. long; anther $\frac{1}{2}$ lin. long, cells quite confluent. Ovary globose; style very short but distinct; upper lip of stigma 0; lower lip large, broad-ovate. Capsule globose, black, bursting in water by the expansion of the mucilaginous placenta, 2–3 lin. in diam.; seeds 4–8, lenticular, very flat, $\frac{3}{4}$–$1\frac{1}{2}$ lin. in. diam., with a narrow membranous wing all round. Embryo discoid, slightly concave on the top with several obscure leaf-

primordia.—DC. Prodr. viii. 6; Benjamin in Mart. Fl. Bras. x. 237; Oliver in Journ. Linn. Soc. iv. 171; Kam. in Engl. Jahrb. xxxiii. 111; Stapf in Dyer, Fl. Cap. iv. ii. 434.

Nile Land. Abyssinia: bays of Lake Tsana, near Currata, *Schimper*, 1457!

Lower Guinea. Angola: by the Quiriri River, near Sakkemecho, 4000 ft., *Baum*, 812!

Also in Natal, Madagascar, and throughout Tropical America.

The number of seeds in a capsule and their size vary. The few-seeded form was described by St. Hilaire (Voy. Distr. Diam. ii. 427) as *U. olygosperma* from Brazilian specimens. It seems to be the form prevalent in Africa. Oliver, l.c., says that the American specimens have sometimes as many as 24 seeds in a capsule. I have never seen so many in the mature state. *U. foliosa* produces frequently slender filiform shoots from the back of the stolons without definite disposition, and bearing only scale-like leaves (aërial shoots of Goebel). They often grow out of the water.

27. **U. platyptera,** *Stapf.* A floating, aquatic herb. Stolons long, branched, slender, glabrous. Leaves all alike, 5–6 lin. apart, 6–9 lin. long, usually 2-partite from or near the base, dichotomously multifid; segments somewhat widened towards the forkings, ultimate segments capillary, rarely more than $1\frac{1}{2}$ lin. long, minutely setulose. Bladders conspicuous, numerous, up to 8 on a leaf, usually from the forks of the leaf-divisions, very obliquely ovoid, up to 2 lin. long, dark-green, mouth sublateral, oblique with 2 fine entire filiform tentacles; stalk very short, more or less lateral. Scapes lateral, $1\frac{1}{2}$–2 in. long, slender, 2-flowered; bract broad-ovate to rotundate, 1 lin. long; bracteoles 0; pedicels slender, erect in flower, at length recurved and up to 10 lin. long. Sepals equal, broad-ovate to rotundate, 1 lin. long, the lower often emarginate. Corolla yellow (*Barter*), not known to me. Pistil ovoid passing gradually into the short style; upper stigmatic lip obscure; lower broad-ovate. Capsule ovoid-ellipsoid, over $\frac{3}{4}$ lin. long. Seeds disc-shaped, more or less pentagonal, $\frac{1}{3}$–$\frac{3}{8}$ lin. in diam. with a broad wing all round; testa and wing reticulate. Embryo lenticular, about $\frac{1}{6}$ lin. in diam.—*U. reflexa*, Oliver in Journ. Linn. Soc. ix. 146, partly; Kam. in Engl. Jahrb. xxxiii. 110, partly.

Upper Guinea. Northern Nigeria: Nupe; in deep pools and swamps, *Barter*, 890!

Very near to *U. reflexa*, from which it differs in having coarser leaves, rather smaller sepals, ovoid capsules, and larger, broad-winged seeds.

28. **U. reflexa,** *Oliver in Journ. Linn. Soc.* ix. 146. A floating, aquatic herb. Stolons long, branched, often matted together, slender, glabrous. Leaves all alike, about 2–3 lin. apart, 2–5-partite, 3–8 lin. long, divisions subequal or, if more than 2, the middle one by far the longest, dichotomously multifid; ultimate segments numerous, capillary, minutely setulose. Bladders rather conspicuous, numerous, up to 8 on a leaf, often from the forks of the leaf-divisions, very obliquely ovoid, up to 2 lin. long, dark green or purplish, mouth sublateral, oblique, delicately and sparingly fimbriate or naked or the fimbriæ fused into staghorn-like antennæ, stalk very short, more or less lateral. Scapes lateral, 1–6 in. long, slender, 2- (rarely 3-) 1-flowered; bract broadly

ovate or rotundate, 1–1½ lin. long; bracteoles 0; pedicel ½–1¼ in. long, erect in flower, then gradually recurving. Sepals subequal, broadly ovate to rotundate, 1–1½ lin. long. Corolla yellow, up to 4½ lin. long; upper lip almost orbicular, 2 lin. long; lower lip rotundate to subquadrate, about 3–4 lin. long; palate broad, slightly 2-gibbous; spur broad-conic, obtuse, 2½–3 lin. long. Filaments ⅜ lin. long, linear; anthers $\frac{3}{16}$ in. long. Pistil passing into the very short style; upper stigmatic-lobe obscure; lower broad-ovate. Capsule globose, almost 1½ lin. in diam. Seeds disc-shaped, more or less pentagonal, ⅕ lin. in diam., with a narrow wing all round; testa reticulate. Embryo sublenticular, undifferentiated.—Oliver in Trans. Linn. Soc. xxix. 123; Hiern in Cat. Afr. Pl. Welw. i. 785; Kam. in Engl. Jahrb. xxxiii. 110, partly. *U. diploglossa*, Kam. l.c., partly.

North Central. Bagirmi: muddy banks of an affluent of the River Shari, *Vogel*, 94!

Nile Land. Jur: Jur Ghattas, *Schweinfurth*, 2594! in the Bahr el Gazal, *Schweinfarth*, iii. 86 partly! Uganda: Unyoro, *Speke & Grant!*

Lower Guinea. Angola: Huilla; in the River Quipumpumhine and most of the other gently flowing streams in Sobato de Humpata, 4800 ft., covering broad tracts, *Welwitsch*, 269! 269 b! by the Cunene River, *Johnston!*

Mozamb. Dist. German East Africa: Lake Victoria, near Bukoba, *Cunnington*, 618!

Very closely allied to *U. diploglossa*, from which it differs only in the longer, more divided leaves, longer scapes, and the orbicular (not ovate) upper corolla-lip.

29. **U. charoidea,** *Stapf.* A floating, aquatic herb. Stolons branched, very slender, hispidulous. Leaves all alike, 2–6 lin. apart, 3–5 lin. long, usually 2-partite from the base or near it, rarely 3–5-partite (with the lateral partitions smaller), dichotomously multifid, hispidulous all over; ultimate segments capillary, rarely more than 1 lin. long. Bladders rather numerous, up to 8 on a leaf, usually from the forks of the leaf-divisions, pale green, obliquely ovoid, up to 1 lin. long, mouth sublateral, oblique, naked (?); stalk very short, more or less lateral. Scapes lateral, 2–5 lin. long, very slender, 1-flowered, glabrous, with an oblong-orbicular broad bract about the middle, over ½ lin. long. Sepals equal, broad-ovate, about 1 lin. long, the lower emarginate. Corolla yellow, 3 lin. long; upper lip ovate, entire, over 1½ lin. long; lower rotundate to subquadrate, 1½ lin. long; palate large, raised, 2-gibbous; spur broad-conic-obtuse, somewhat longer than the lower lip. Pistil globose-ovoid, passing into the very short style; upper stigmatic-lip obscure; lower broad-ovate. Capsule ellipsoid-ovoid, scarcely 1 lin. long; perfect seeds very few, lenticular, orbicular to elliptic-orbicular, about ⅓ lin. in diam., with a narrow irregular wing all round; testa delicately reticulate. Embryo lenticular. —*U. reflexa*, Oliver in Journ. Linn. Soc. ix. 146, partly; Kam. in Engl. Jahrb. xxxiii. 110, partly.

Upper Guinea. Northern Nigeria: at the confluence of the Niger and Benue Rivers, *Barter!*

Very marked by the hispidulous indumentum, the small flowers and capsules and the few, non-angular seeds.

30. **U. diploglossa,** *Welwitsch ex Oliv. in Journ. Linn. Soc.* ix. 147. An amphibious herb, floating or terrestrial on spongy places by rivers. Stolons up to ½ ft. long, branched, sometimes matted into cushions, very slender, glabrous. Leaves all alike, 1–3 lin. apart, 3–5-partite, 1–3 lin. long, divisions multifid; ultimate segments 5–8, capillary, glabrous, terminating with a short fine bristle. Bladders very conspicuous, replacing a leaf-division or more often a basal segment, 1 or 2 (rarely 3) with each leaf, obliquely ovoid, up to 2 lin. long, often purple, mouth sublateral, delicately fimbriate, some of the fimbriæ often fused at the base, stalk very short. Scapes lateral, ¾–1 lin. long, slender, with a single, broad-oblong or elliptic, obtuse or emarginate bract, 1 lin. long, 2–8 lin. below the flower. Sepals equal, ovate-rotundate or broad-elliptic, obtuse, 1 lin. long. Corolla yellow, 4–4½ lin. long; upper lip ovate, entire or crenulate at the apex, not quite 2 lin. long; lower lip broad-rotundate, slightly and broadly 2-lobed, sides deflexed, 3–4 lin. long; palate large, slightly 2-gibbous; spur broadly-conic, obtuse, 2½–3 lin. long. Filaments linear, slightly over ½ lin. long; anthers ¼ lin. long. Pistil passing gradually into the very short style; upper stigmatic lip obscure; lower rotundate. Mature capsule and seeds unknown.—Hiern in Cat. Afr. Pl. Welw. i. 786; Kam. in Engl. Jahrb. xxxiii. 110, partly; Stapf in Dyer, Fl. Cap. iv. ii. 434.

Lower Guinea. Angola: Huilla; Morro de Lopollo, 5300 ft., *Welwitsch*, 271! banks of the River Monino, *Welwitsch*, 272 b!

Also in the Transvaal.

31. **U. cymbantha,** *Oliv. in Journ. Linn. Soc.* ix. 147. A very delicate herb, floating or creeping on mud. Stolons capillary, branching, more or less matted, green, glabrous, minutely glandular. Leaves all alike, about 1 lin. apart, forked from the base, divisions equal or unequal, entire or one of them forked again, up to ¼–1¼ lin. long, capillary, acute, glabrous. Bladders in the place of a leaf-division or a segment of a division, obliquely ovoid, ⅓ lin. long, mouth sublateral, oblique, delicately fimbriate, fimbriæ unequal, longest sometimes branched, insertion of the stalk sublateral. Scapes lateral, up to 4 lin. long, with a minute ovate scale at the middle, erect when flowering, nodding when mature. Sepals orbicular or depressed-orbicular, subequal; upper ½ lin. long, nerveless. Corolla yellowish, about 1 lin. long; upper lip very broad and short, subtruncate; lower lip sub-semicircular, broader than long, subcordate at the base, slightly convex, mouth wide open; spur very short, wide saccate, subgibbous and glandular in front. Filaments linear, ¼ lin. long; anther $\frac{1}{10}$ lin. long. Ovary globose-ovoid; style distinct, as long as the stigma; upper stigmatic-lip very small; lower elliptic-rotundate; ovules about 5 on a subglobose placenta. Seeds (not quite mature) about 3, lenticular with a membranous wing all round, ¼ lin. in diam.—Hiern in Cat. Afr. Pl. Welw. i. 786. *Biovularia cymbantha,* Kam. in Engl. Jahrb. xxxiii. 113.

Lower Guinea. Angola: Huilla; shallow pools near Morro de Lopollo, forming together with Algae spongy masses, *Welwitsch*, 272!

The structure of the ovary, capsule and seeds is as in typical *Utricularia*, and

quite different from that of *Biovularia*, an American genus. The corolla is rather peculiar on account of the very short and wide sac-like spur and the widely gaping mouth, but the upper and lower lips are quite distinct, the latter being so constricted at the base as to be almost cordate.

32. **U. obtusa,** *Swartz, Nov. Gen. et Sp. Pl.* 14. An aquatic herb, floating or creeping on liquid mud, sometimes matted into extensive felt-like masses. Stolons long, branched, finely filiform, flat, green, glabrous, frequently with arrested buds in the leaf-axils from the bases of which spring small whorls of leaves and stolons. Leaves all alike, about 2–3 lin. apart, forked from the base or near it, $2\frac{1}{2}$–5 lin. long; partitions usually forked again above the middle, or entire; ultimate segments capillary, smooth, flexuous. Bladders usually in the place of 1 or 2 of the ultimate leaf-segments and also near the tips of the stolons, obliquely ovoid, up to $\frac{3}{4}$ lin. long, mouth sublateral, oblique, oblong, fimbriate, fimbriæ unequal, longest branched, insertion of stalk lateral. Scapes lateral, filiform, erect, 2–4 in. long, 4–1-flowered, with or without 1 or 2 minute scales. Flowers distant if more than 2; bracts rotundate-oblong, $\frac{1}{2}$–$\frac{3}{4}$ lin. long; bracteoles 0; pedicels filiform, permanently straight, obliquely erect, at length up to 5 lin. long. Sepals equal, rotundate-ovate, 1 lin. long, green, enlarged in fruit, orbicular and over $1\frac{1}{2}$ lin. in diam. Corolla yellow, 3–5 lin. long; upper lip broad-ovate, obtuse, entire, $2\frac{1}{2}$ lin. long; lower lip rotundate, $2\frac{1}{2}$ lin. long, with a large raised 2-gibbous palate; spur conic, rather slender, obtuse or subacute, about 3 lin. long. Anthers $\frac{3}{8}$ lin. long. Ovary subglobose; style very short; upper stigmatic lip obscure; lower suborbicular. Capsule globose, $1\frac{1}{2}$ lin. in diam.; seeds elliptic-orbicular, lenticular, up to almost $\frac{1}{2}$ lin. in diam., with an opaque corky wing all round. Embryo lenticular, up to $\frac{1}{3}$ lin. long.—Swartz, Fl. Ind. Occ. i. 41 (*obtusata*); DC. Prodr. viii. 10; Benjam. in Mart. Fl. Bras. x. 239; Kam. in Engl. Jahrb. xxxiii. 113. *U. tricrenata*, Baker ex Hiern in Cat. Afr. Pl. Welw. i. 785. *U.* sp. nov.? aff. *U. gibbæ*, Oliver in Journ. Linn. Soc. ix. 147.

Lower Guinea. Angola: Huilla; muddy shore of Lake Ivantala, 4000 ft., *Welwitsch*, 270! backwaters at the junction of the Chitanda and Cunene Rivers, 3660 ft., *Baum*, 123!

Also throughout Tropical America. Kamienski indicates this species also from Stanley Pool (*Duchesne*).

33. **U. exoleta,** *R. Br. Prodr.* 430. An aquatic herb, floating in water or creeping on liquid mud. Stolons of varying length, much branched; branches often fascicled, from a few inches to almost 1 foot long, very slender, flat, green and leafy or bleached and almost naked. Leaves varying considerably in the degree of development, rarely more than 2 lin. long, very sparingly dissected, usually one or several of the segments represented by bladders, or the whole leaf replaced by a bladder, normal segments delicately capillary, glabrous. Bladders obliquely globose-ovoid, rarely more than $\frac{1}{2}$ lin. long, mouth subapical, truncate with delicate branched cilia. Raceme 3–2-flowered or reduced to a single flower; peduncle slender, filiform, straight or flexuous, 2–3 in.

long, rarely longer; bracts membranous, broad-obovate, truncate or rounded, $\frac{1}{2}$ lin. long, lowest 1 or 2 often barren; bracteoles 0; pedicels finely filiform, permanently obliquely erect, of very unequal length, the longest up to 4 lin. long. Sepals equal, orbicular-elliptic, up to 1 lin. long, membranous, scarcely enlarging after flowering. Corolla yellow, $2\frac{1}{2}$–3 lin. long; upper lip ovate-rotundate, entire or subentire, 1–$1\frac{1}{2}$ lin. long; lower lip subquadrate, $1\frac{1}{2}$ lin. long, slightly 2-lobed or almost entire; palate much raised, obscurely 2-gibbous, minutely papillose, margin spreading or deflexed; spur conic, obtuse, spreading, as long as or somewhat longer than the lower lip. Filaments curved, dilated upwards, $\frac{1}{2}$ lin. long; anthers ellipsoid, $\frac{1}{4}$ lin. long. Ovary subglobose; style very short, but distinct; upper stigma-lobe obscure; lower rotundate. Capsule globose, 1–2 lin. in diam.; seeds numerous, lenticular, $\frac{1}{2}$ lin. in diam., with a thin corky or transparent, somewhat irregular, and often eroded wing around the margin, hilum excentric. Embryo lenticular, slightly emarginate, undifferentiated.—DC. Prodr. viii. 7; Benth. Fl. Austral. iv. 526; C. B. Clarke in Hook. f. Fl. Brit. Ind. iv. 329; Aschers. in Ber. Deutsch. Bot. Ges. iv. 404; Boiss. Fl. Or. Suppl. 339; Batt. & Trab. Fl. Alg. i. 718; Coss. Ill. Fl. Atl. 100, t. 162; Hiern in Cat. Afr. Pl. Welw. i. 786; Kam. in Engl. Jahrb. xxxiii. 112; Goebel in Ann. Jard. Bot. Buitenz. ix. 91–97; Stapf in Dyer, Fl. Cap. iv. ii. 435. *U. diantha*, Roem. & Schultes, Syst. Veg. Mant. i. 169; Benth. Fl. Hongk. 256; Wight, Ic. Pl. t. 1569; Oliv. in Journ. Linn. Soc. iii. 176, & ix. 147, not of DC. *U. ambigua*, DC. l.c. 9.

Upper Guinea. Sierra Leone: Limba; Makunde, *Scott-Elliot*, 5718! Lagos Island, *Barter*, 20212!

Nile Land. Abyssinia: Bays of Lake Tsana, *Schimper*, 1450! and without precise locality, *Schimper*, 1449! Gallabat: near Matamma, *Schweinfurth*, 2582! Soudan: Ghabat el Arab, *Brown!* Meshera, *Schweinfurth*, 1249!

Lower Guinea. Loango: Chinchocho; in a stream near Calowe, *Soyaux*, 173! Angola: Icolo e Bengo; floating in Lake Funda, *Welwitsch*, 267! Barro do Dande; floating or growing on damp mud near the River Dande and the lakes of Bombo, *Welwitsch*, 267*b*! Benguella; Chihinde, *Baum*, 41! German South-west Africa: Damaraland; Grootfontein, *Dinter*, 678!

Mozamb. Dist. German East Africa: Ugalla River, *Böhm*, 77! Lake Tanganyika, at the mouth of the Malagarazi River, *Cunnington*, 811! British Central Africa: Urungu; Abercorn, *Carson!*

Also in South Africa, Algiers, Portugal, and from India to China and Australia.

Imperfectly known species.

34. **U. incerta,** *Kam. in Engl. Jahrb.* xxxiii. 111. A floating, aquatic herb. Stolons very long, branched, filiform, to over $\frac{1}{2}$ lin. thick, glabrous. Leaves $2\frac{1}{2}$–$3\frac{1}{2}$ lin. apart, usually forked from or from near the base, up to over 1 in. long, rays up to $\frac{1}{2}$ lin. broad at the base, elegantly 2-pinnate, ovate-oblong to oblong in outline; pinnæ up to $2\frac{1}{2}$ (rarely 3) lin. long; ultimate segments toothed, filiform, and minutely setulose.

Nile Land. Soudan; Bahr el Ghazal, *Schweinfurth*, iii. 86!

2. **GENLISEA,** St. Hil.; Benth. et Hook. f. Gen. Pl. ii. 988.

Calyx deeply 5-partite, persistent; segments equal or subequal, ovate to lanceolate. Corolla 2-lipped, spurred; upper lip erect, entire or emarginate; lower lip larger than the upper, with a vaulted more or less 2-gibbous palate and a deflexed 3-lobed margin. Stamens 2; filaments curved, short, sometimes asymmetrically winged; anthers dorsifixed, cells subdistinct or confluent; pollen globose, smooth with 3 pores. Ovary more or less globose, 1-celled; style short or very short; stigma 2-lipped, anticous lobe much larger than the posticous; ovules numerous, sessile on the free central fleshy placenta, anatropous. Capsule usually globose, circumscissile or breaking up irregularly. Seeds ovoid, often very oblique, exalbuminous; testa subtransparent, spongy, subbullate. Embryo hippocrepiform (always?), not differentiated.—Rootless, terrestrial annual (?) herbs, growing in swamps, with peculiar pitcher-like organs (modified leaves) for the capture and digestion of small organisms. Primary axis terminating with an inflorescence, producing at the base often very dense rosettes of leaves and frequently root-like organs (*rhizoids*), the latter from the axis or the base of axillary buds. Leaves heteromorphic; foliage leaves petioled, entire, spathulate to suborbicular, persistent at the time of flowering; pitcher-leaves consisting of a stalk and a slender tube, cylindric from an ellipsoid base and passing into 2 long ribbon-like spirally twisted arms, the arms and tube provided on the inner side with transverse bands of stiff reversed hairs and the tube also with digestive glands. Inflorescence racemose, bracteate, peduncled; lower bracts usually barren, adpressed; bracteoles 2, at the base of the pedicel.

Species about 7–8, one species in South Africa, the others in Tropical South America.

A barren plant collected by Welwitsch in Angola and numbered 6743, is referred to by Hiern in Cat. Afr. Pl. Welw. i. 789 as being possibly a species of *Genlisea*. It does not belong to *Lentibularieæ*.

Inflorescence and ovary densely glandular-puberulous .	1. *G. africana.*
Inflorescence hispidulous or glabrous; ovary glabrous or densely pubescent.	
Ovary densely pubescent above the glabrous base .	2. *G. hispidula.*
Ovary quite glabrous	3. *G. subglabra.*

1. **G. africana,** *Oliver in Journ. Linn. Soc.* ix. 145, *partly.* Leaves numerous; blades spathulate-cuneate, 2–3 lin. long, 1–1½ lin. broad, gradually narrowed into the petiole, 2–5 lin. long. Utricles very variable in size; tube 3–7 lin. long. Scape erect, up to over 1 ft. long, filiform, simple, or with a branch from the lower part, copiously glandular-puberulous, at length glabrescent near the base, with a few remote barren bracts in the lower part; raceme densely glandular-puberulous all over, 3–6-flowered; bracts ovate, up to ¾ lin. long; bracteoles similar; pedicels filiform, obliquely erect or ascending, 4–5 lin. long. Calyx-segments subequal, lanceolate-ovate, acute, 7–8 lin. long. Corolla pale purple, drying blue, about 4 lin. long; upper lip

ovate, submarginate, $2\frac{1}{2}$ lin. long; lower lip 3-lobed, over 3 lin. long; palate slightly 2-gibbous, much raised; spur cylindric from a conic base, truncate, glandular-puberulous, very slightly shorter than the lower lip. Filaments broad-linear, under 1 lin. long; anthers $\frac{1}{2}$ lin. long. Ovary densely glandular-puberulous. Capsule globose, 2 lin. in diam., glandular-puberulous. Seeds more or less globose-ellipsoid, $\frac{1}{5}$ lin. long.—Hiern in Cat. Afr. Pl. Welw. i. 789; Kam. in Engl. Jahrb. xxxiii. 92, partly.

Lower Guinea. Angola: Huilla; marshy places by the Lopollo River, 5000–5200 ft., *Welwitsch*, 260! 260*b*! Humpata; Chella Mountains, *Johnston!* near the Cunene River, *Johnston!*

2. **G. hispidula,** *Stapf in Dyer, Fl. Cap.* iv. ii. 437. Leaves numerous; blades obovate-spathulate, $3\frac{1}{2}$-7 lin. long, 2–$3\frac{1}{2}$ lin. broad, gradually passing into the long whitish petiole, 4–15 lin. long. Utricles on sometimes very long stalks (up to 10 lin.); tube 7–8 lin. long; twisted arms over 10 lin. long. Peduncle erect, straight or flexuous, simple or branched, up to 1 ft. high, quite glabrous or with a few spreading bristles in the upper part. Raceme 3–5-flowered; flowers remote; bracts and bracteoles lanceolate, acuminate, $1\frac{1}{2}$ lin. long, more or less minutely hispidulous, lowest bracts barren; pedicels filiform, 3–5 lin. long in flower, at length up to 10 lin. long, more or less hispid with yellow bristles, particularly in the upper part, rarely glabrous. Calyx-segments lanceolate, subacuminate or acuminate, subequal, $1\frac{1}{2}$–2 lin. long, minutely hispidulous. Corolla purple with yellow spots on the palate, 4–5 lin. long; upper lip ovate, obtuse, $1\frac{3}{4}$ lin. long; lower lip $2\frac{1}{2}$ lin. long, 3-lobed; lobes short and broad, almost equal, scarcely undulate; palate much raised, lower than the upper lip, scarcely gibbous; spur cylindric from a moderately widened base, $3\frac{1}{2}$ lin. long, obtuse or truncate, sparingly and very minutely hispidulous. Filaments curved, very unequally widened upwards, not quite $\frac{1}{2}$ lin. long; anthers $\frac{3}{8}$ lin. long. Ovary densely pubescent above the glabrous base. Capsule more or less hairy in the upper part, globose, up to 2 lin. in diam., distinctly circumscissile. Seeds obliquely ovoid or almost triangular in profile, up to $\frac{1}{4}$ lin. long. Embryo subhippocrepiform.—*G. africana*, Oliver in Journ. Linn. Soc. xxxiii. 175 (the Magalisberg specimen); Kam. in Engl. Jahrb. xxxiii., 92, partly.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Zomba, 4000–6000 ft., *Whyte!*

Also in South Africa.

3. **P. subglabra,** *Stapf.* Leaves rather numerous; blades more or less obovate-cuneate, 4–6 lin. long, up to 3 lin. broad, gradually passing into the slender petiole, up to 6 lin. long. Utricles unknown. Scape erect, filiform, simple or very sparingly branched, glabrous, with a few remote barren bracts in the lower part; raceme 3–5-flowered; flowers remote; bracts ovate to ovate-lanceolate, up to 1 lin. long, glabrous like the similar, but narrower bracteoles; pedicels filiform, obliquely erect, up to 5 lin. long, quite glabrous or sparingly puberulous

near the tips, some of the hairs gland-tipped. Calyx subglabrous or glabrous ; segments subequal, ovate-lanceolate, acute, the lowermost broader, more obtuse and with more numerous nerves. Corolla deep blue when dry, with a yellow palate, $3\frac{1}{2}$ lin. long ; upper lip very broadly ovate, obtuse, $1\frac{1}{2}$ lin. long ; lower lip 3-lobed, $2\frac{1}{2}$ lin. long ; palate slightly 2-gibbous, much raised, higher than the upper lip ; spur short-cylindric from a wide conic base, truncate, sparingly glandular-puberulous, very slightly shorter than the lower lip. Filaments much and asymmetrically widened upwards from a narrow base, $\frac{1}{2}$ lin. long ; anthers $\frac{3}{8}$ lin. long. Ovary glabrous. Capsule globose, 1–$1\frac{1}{4}$ lin. in diam., glabrous. Seeds obliquely ovoid to almost triangular in profile, $\frac{1}{6}$ lin. long.

Mozamb. Dist. British Central Africa : Kambole, south-west of Lake Tanganyika, 5000 ft., *Nutt !* Urungu ; Fwambo, 5250 ft., *Nutt !*

Very closely allied to *G. africana*, from which it differs mainly in the much larger leaves, the glabrous or very sparingly hairy inflorescences and glabrous ovary.

ORDER XCV. **GESNERACEÆ.** (By J. G. Baker and C. B. Clarke.)

Flowers bisexual, irregular. Calyx inferior (in the Old World sub-order *Cyrtandreæ* to which all the African species belong), small, gamosepalous, persistent, 5-lobed. Corolla gamopetalous ; tube long or short ; limb 5-lobed, oblique, more or less 2-lipped, the two posticous lobes smaller. Stamens 2 perfect, (in *Acanthonema* sometimes 4), on the corolla (rudiments of the other 2–3 often present) ; anther-cells often ultimately confluent. Ovary completely superior, supported by a disc (sometimes small), ovoid or oblong, narrowed into a linear-cylindric style ; stigma capitate or emarginate or in *Trachystigma* divided into 2 rough lobes. Ovary 1-celled (at least at its top) ; the 2 parietal placentas much intruded, in most cases so as to press against each other in the middle and carry no ovules there ; in *Epithema* the two placentas are on stalks rising from the base of the capsule ; ovules very numerous on the margins of the placentas. Capsule long or short, loculicidal except in *Epithema*. Seeds very many, small (400–600 μ. long), ellipsoid or oblong, brown, exalbuminous ; embryo straight.—Hairy herbs or very small shrubs (in Africa). Leaves opposite, petioled, or subradical (in *Linnæopsis* alternate), undivided, pinnate-veined, entire or shallowly crenate-serrate. Peduncles axillary (in caulescent species) or subradical ; carrying loose cymes (rarely 1-flowered, or in *Epithema* quasi-capitate) ; bracts very small except in *Epithema*.

Species 550 in the Old World, 350 in the New. The scarcity of the species in Africa as compared with the abundance in South-east Asia and Tropical America is one of the characteristics of the African Flora. The endemic genus *Streptocarpus* is the only important one in Africa.

This order is easily distinguished from the other irregular gamopetalous orders,

except from *Scrophulariaceæ* which differ by having a completely 2-celled ovary (with the numerous seeds on axile placentas in each cell). But in many *Gesneraceæ*, if a horizontal section is made across the lower half of the ovary, the two placentas are nearly (or quite !) confluent by their inner flattened faces, and the section is then that of a *Scrophulariacea*, and some of the figures cited below as gesneraceous show this. To be sure that a plant is gesneraceous, a cross-section must be made through the upper half of the ovary, when the two placentas can be seen to be parietal.

Capsule ovoid or oblong.	
Cyme open ; leaves several, petioled	1. SAINTPAULIA.
Cyme condensed into a small head	2. EPITHEMA.
Cyme open ; leaf 1, basal, sessile	3. ACANTHONEMA.
Capsule linear.	
Capsule-valves flat after dehiscence.	
Stigma emarginate, hardly 2-fid	4. DIDYMOCARPUS.
Stigma of two oblong rough branches . . .	5. TRACHYSTIGMA.
Capsule-valves twisting up after dehiscence . .	6. STREPTOCARPUS.
Capsule oblong ? Creeping, with distant alternate leaves	7. LINNÆOPSIS.

1. **SAINTPAULIA,** Wendl. in Gartenfl. xlii. 321, t. 1391.

Calyx small, deeply 5-lobed. Corolla wide-campanulate; tube short; lobes elliptic, a fine blue, the two posticous shorter (sometimes much shorter) than the others. Stamens (perfect) 2, on the corolla; filaments nearly or quite glabrous; anther-cells very large, yellow, even when young orbicular, dehiscing by one continuous short slit. Ovary hairy; style glabrous upwards; stigma oblique, hardly 2-fid; placentation as in *Streptocarpus*. Capsule oblong, loculicidally 2-valved; valves after dehiscence flat, the placentas attached to the middle of the valve, covering the seeds by their inrolled margins. Seeds small, ellipsoid, smooth.—Herbs, hairy, often stemless. Leaves long-petioled, ovate. Peduncles radical (or axillary in the caulescent species), 1–5 in. long, carrying several (or 1) flowers in a loose cyme; bracts very small.

Species 4, endemic.

This genus differs from several others in characters of small importance. It differs from *Didymocarpus* and *Chirita* only in the capsule being oblong (not linear). The corolla, stamens, and large anthers are exceedingly like those of *Bæa*, which differ by having twisted capsule-valves. Engler (in *Engl. Jahrb.* xxviii. 482) doubts if the genus can be kept distinct from the Chinese *Petrocosmia*, Oliver; and Fritsch (in *Engl. & Prantl, Pflanzenfam.* iv. 3 B. 185) states that *Petrocosmia* only differs by having the anther-cells (just before dehiscence) oblong and parallel, which is right.

Stemless.	
Corolla $\frac{2}{3}$ in. in diam.	
Leaves crenate, thin, with two kinds of hairs .	1. *S. ionantha.*
Leaves entire, thick, with uniform hairs . .	2. *S. kewensis.*
Corolla $\frac{1}{3}$ in. in diam.	3. *S. pusilla.*
Stem 4–6 in. long, with distant pairs of leaves . .	4. *S. gœtzeana.*

1. **S. ionantha,** *Wendl. in Gartenfl.* xlii. 321, *t.* 1391, *and* 323, *Abbild.* 66. Stemless, hairy. Leaves many; blade $1\frac{1}{2}$ by $1\frac{1}{4}$ in.,

ovate or subcordate, thin in texture, regularly crenate, clad on both surfaces with many small hairs and a few scattered very long multicellular white hairs; petioles 1–2 in. long. Peduncles 1–4 in. long, 1–6-flowered. Calyx-lobes $\frac{1}{6}$ in. long, linear. Corolla $\frac{3}{5}$ in. in diam.; lobes not very unequal. Filaments glabrous; pollen 25 μ in diam., globose. Capsule about 5 lin. long, narrowly oblong.—Bull. Soc. Tosc. Ort. 1894, 13, fig. 1; Neub. Gartenmag. 1894, 362, fig. 97; Engl. in Engl. Pflanzenw. Ost-Afr. C. 362; Fritsch in Engl. & Prantl, Pflanzenfam., iv. 3 B. 185.

Mozamb. Dist. German East Africa: Usambara, *Buchwald*, 149!

2. **S. kewensis,** *C. B. Clarke.* Leaves entire, with numerous long many-celled white hairs. Calyx-lobes $\frac{1}{5}$ in. long, oblong-linear. Filaments sparsely and minutely hairy; pollen ellipsoid, 50 by 35 μ. Capsule 2 or 3 times as broad as that of *S. ionantha*, more shaggy with long white hairs; otherwise as *S. ionantha*.—*S. ionantha*, Hook. f. Bot. Mag. t. 7408; (Rev. Hort. Belg. 1894, 109, with fig. ?)

Mozamb. Dist. German East Africa: Usambara; near Tanga, cultivated specimens raised from seed introduced by *Baron Saint Paul!*

This may prove to be a form of *S. ionantha* that has arisen in cultivation.

3. **S. pusilla,** *Engl. in Engl. Jahrb.* xxviii. 481, *t.* 7, *upper figure.* Similar to *S. ionantha*, Wendl., but smaller in every part. Leaf-blade 1 by $\frac{2}{3}$ in., sparsely hairy, entire, purple beneath. Cymes small, few-flowered. Calyx-lobes $\frac{1}{8}$ in. long. Corolla $\frac{1}{3}$ in. in diam. Capsule $\frac{1}{3}$ by $\frac{1}{12}$ in.

Mozamb. Dist. German East Africa: Uluguru; Lukwangula Plateau, 4000–5600 ft., *Goetze*, 205.

There is in the British Museum a fragment of a *Saintpaulia* collected in the Giryama and Tsimba Mountains by W. E. Taylor, which does not exactly agree with any of the 3 foregoing. The leaf would be 3 or $3\frac{1}{2}$ in. long, the flowers perhaps $\frac{1}{2}$ in. diam.

4. **S. gœtzeana,** *Engl. in Engl. Jahrb.* xxviii. 481, *t.* 6. Somewhat densely white-hairy. Stems elongate, up to 4–6 in. long, with several pairs of opposite leaves $\frac{1}{2}$–1 in. apart. Leaves as those of *S. kewensis.* Peduncles solitary, axillary, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, 1–3-flowered. Flowers nearly as those of *S. kewensis*, but the corolla-lobes more unequal, the 2 posticous much shorter than the others.

Mozamb. Dist. German East Africa: Uluguru; Lukwangula Plateau, 4000–6300 ft., *Goetze*, 245.

2. **EPITHEMA,** Blume; Benth. et Hook. f. Gen. Pl. ii. 1017.

Calyx inferior, 5-lobed about half-way down. Corolla small; tube funnel-shaped; limb unequally 5-lobed, blue. Stamens (fertile) 2, posticous, on the corolla-tube; anther-cells 2, orbicular, confluent. Ovary ovoid; stigma subcapitate; placentas stalked, shield-shaped, covered all over with stalked ovules. Capsule membranous, ellipsoid,

circumscissile. Seeds 400 μ long, oblong, brown, spirally striated longitudinally, on small funicles.—Weak, small, hairy, succulent herbs, the African species stemless. Peduncle bearing at its top a one-sided or hooded bract which surrounds the dense inflorescence; pedicels hardly any, scorpioid, forming apparently a small head.

Species 7, the others in South-eastern Asia.

Peduncles 1 in. long; calyx $\frac{1}{8}$–$\frac{1}{6}$ in. long . . .	1. *E. tenue.*
Peduncles $3\frac{1}{2}$ in. long; calyx $\frac{1}{5}$ in. long . . .	2. *E. thomense.*

1. **E. tenue,** *C. B. Clarke in DC. Monogr. Phan.* v. 181. Stemless or nearly so. Leaves (blade) 3 by 2 in., cordate, ovate, irregularly crenate, with many-celled hairs on both surfaces; nerves 8–9 pairs; petiole $1\frac{1}{2}$ in. long. Peduncles 1 in. long; bract campanulate, oblique, $\frac{1}{4}$ in. long. Calyx $\frac{1}{8}$–$\frac{1}{6}$ in. long.—Fritsch in Engl. & Prantl, Pflanzenfam. iv. 3 B. 160.

Upper Guinea. Fernando Po, *Mann*, 2345!

2. **E. thomense,** *Henriq. in Bolet. Soc. Brot.* x. 145. Leaves (blade) $3\frac{1}{2}$ by 3 in. Peduncles $3\frac{1}{2}$ in. long; bract $\frac{1}{3}$ in. long. Calyx $\frac{1}{5}$ in. long.

Lower Guinea. Island of St. Thomas, 3000 ft., *Quintas!*

Except in its larger size this is equal to *E. tenue;* Henriques says that *E. tenue* differs by its palminerved leaves; but I see no difference in the nervation. All the species of *Epithema* are so similar in structure that the differences in size (which are very great in the well-known *E. carnosum*) are of very doubtful specific value.

3. **ACANTHONEMA,** Hook. f.; Benth. et Hook. f. Gen. Pl. ii. 1021.

Calyx small, deeply 5-lobed. Corolla tubular, oblique; limb of 5 short rounded lobes. Stamens on the corolla 4 (often only the 2 anticous developed), the 2 posticous with a tooth close to the anthers. Disc oblique. Ovary 2-celled; the two parietal placentas intruding till they nearly meet, bearing numerous ovules on their margins; stigma emarginate. Capsule ovoid, small (pericarp very tough), loculicidal. Seeds under the recurved margins of the placenta, ellipsoid, 400 μ long, brown.—Leaf 1, *i.e.*, the other cotyledon disappears; the permanent cotyledon grows on and is carried 1–5 in. up an apparent stem as in some species of *Streptocarpus*. Peduncles 1–4 at the base of the leaf, 0–2 in. long, each carrying 1–12 flowers in a lax cyme. (The cross section of the ovary depicted in Bot. Mag. t. 5339 must have been taken very near the base to show the placentas confluent.)

1. **A. strigosum,** *Hook. f. Bot. Mag. t.* 5339. Leaf (cotyledon) ovate or oblong, sessile, cordate, thinly hairy on both surfaces, growing out to 9 in. long; margin subentire; nerves 20 pairs. Pedicels $\frac{1}{3}$ in. long, with many-celled hairs; bracts at their base minute. Calyx-lobes $\frac{1}{10}$ in. long, oblong, with many-celled hairs. Corolla-tube $\frac{3}{5}$ in. long; limb violet-purple. Anthers confluent in pairs; tooth at the top of the anticous stamens very small; posticous stamens very frequently

reduced to rudimentary filaments. Capsule $\frac{1}{6}$–$\frac{1}{5}$ in. long. Seeds and pollen as of *Streptocarpus*.—C. B. Clarke in DC. Monogr. Phan. v. 157; Fritsch in Engl. & Prantl, Pflanzenfam. iv. 3 B. 156. *Carolofritschia diandra*, Engl. in Engl. Jahrb. xxvi. 362.

Upper Guinea. Fernando Po, 200–2000 ft., *Mann*, 569! Cameroons: Cameroon Mountain, 5000 ft., *Mann*, 1948! Efulen, *Bates*, 391! near Lolodorf, 2400 ft., *Zenker*, 1381! *Staudt*, 118!

4. **DIDYMOCARPUS,** Wall.; Benth. et Hook. f. Gen. Pl. ii. 1021.

Capsule-valves in dehiscence straight, not twisted spirally; otherwise as *Streptocarpus*.—In this one species of Tropical Africa, stem elongate with opposite leaves; inflorescence axillary, shorter than the petioles.

Species 90, mostly in South-east Asia, with 3 or 4 in Madagascar, and the following:

1. **D. kamerunensis**, *Engl. in Engl. Jahrb.* xviii. 79, *tt.* 4–5, *fig. F.* Stem weak, branched, 1 ft. long; stem and branches freely rooting. Leaves up to $2\frac{1}{2}$ by $1\frac{1}{2}$ in., ovate, subentire, obtuse at the base, thin, with very few hairs; nerves 7 pairs; petioles 1–2 in. long. Pedicels axillary, $\frac{1}{8}$–$\frac{1}{3}$ in. long. Calyx $\frac{1}{5}$–$\frac{1}{4}$ in. long; lobes linear-oblong, with many-celled white hairs. Corolla $\frac{1}{3}$ by $\frac{1}{6}$ in., yellow, urceolate; lobes very short. Stamens 2. Ovary minutely puberulous, not hairy. Capsule $\frac{2}{3}$ in. long, linear.

Upper Guinea. Cameroons; Barombi, *Preuss*, 951!

The only example at Kew has no corolla; and much of the above description is copied from Engler. As regards the stigma, it appears to me shortly and unequally 2-lobed, as in *Chirita*, and not exactly as figured by Engler. The habit of the species also is much as that of the small *Chiritas*.

5. **TRACHYSTIGMA**, C. B. Clarke in DC. Monogr. Phan. v. 131.

Style with 2 short-oblong papillose lobes. Capsule-valves not spirally twisted. Otherwise as *Streptocarpus*, Sect. *Unifoliatæ*.

Species 1, endemic.

1. **T. Mannii**, *C. B. Clarke in DC. Monogr. Phan.* v. 131, *t.* 14. Leaf (a permanent cotyledon?) 1, spreading flat, sessile, cordate-ovate, 3–5 in. in diam., or growing out to 18 in., subentire, pubescent. Peduncles 1–4, 2–4 in. long, carrying many flowers in a loose panicled cyme; pedicels $\frac{1}{2}$–1 in. long, glabrate; bracts at the divisions $\frac{1}{5}$ in. long, oblong, or wanting. Calyx $\frac{1}{8}$ in. long; lobes oblong, ending in a gland. Corolla $\frac{1}{3}$ in. long, purple. Ovary glabrous; summit of style scabrid. Capsule $\frac{3}{4}$ in. long, linear.—*Rœttlera Mannii*, Fritsch in Engl. & Prantl, Pflanzenfam. iv. 3 B, 148.

Upper Guinea. Gaboon: Sierra del Crystal, *Mann*, 1682!

6. **STREPTOCARPUS,** Lindl.; Benth. et Hook. f. Gen. Pl. ii. 1023.

Calyx inferior, deeply 5-fid, $\frac{1}{10}$–$\frac{1}{4}$ in. long. Corolla-tube cylindric or funnel-shaped; limb of 5, often very unequal, rounded lobes. Stamens 2, on the corolla-tube, with rudiments of 2 or 3 posticous stamens; anther-cells early confluent; pollen globose, 15μ in diam., except in *S. lagosensis*. Ovary superior, cylindric; placentas much intruded, bearing numerous ovules only on their margins; style linear-cylindric, persistent; stigma subcapitate. Capsule linear, 1–2$\frac{1}{2}$ in. long, splitting into two spirally twisted valves, which separate from the placentas. Seeds very many, small (about 500 μ long), ellipsoid to oblong, umbonate, brown.—Herbs 6–30 in. high, or stemless. Peduncles carrying many flowers in lax cymes, or (in *S. Saxorum*) 1-flowered; bracts at the cyme-divisions very small, or more often 0. Species all more or less hairy with many-celled, sometimes gland-tipped, hairs.

Species 50, confined to Africa south of the Tropic of Cancer and the Mascarene Islands. Several species are closely allied in small groups; and it is possible that several of these groups may be agglomerated into 1 species each, when more material comes to hand. So far as the present material goes, it rather suggests that *Streptocarpus* in Africa, like *Didymocarpus* in S.E. Asia and *Cyrtandra* in Polynesia, is rich in species each having a very restricted habitat.

§ 1. *Unifoliate.*—Stemless. Leaf (permanent cotyledon) 1, large, sessile, flat on the ground. Peduncles 1–4, repeatedly divided into compound cymes. Ovary and style densely hairy. Calyx-lobes linear (or scarcely narrow-oblong), without a gland at the tip, hairy. Hairs rarely gland-tipped.

Corolla 2 in. long . . . . . 4. *S. benguelensis.*
Corolla $\frac{3}{4}$–1 in. long.
  Calyx-lobes $\frac{1}{4}$ in. long. Corolla blue . . . 1. *S. Mahoni*
  Calyx-lobes $\frac{1}{6}$ in. long.
    Corolla pale blue . . . . . 2. *S. tubiflos.*
    Corolla violet . . . . . 5. *S. katangensis.*
Corolla scarcely $\frac{2}{3}$ in. long . . . . . 3. *S. breviflos.*

§ 2. *Rosulatæ.*—Stem hardly any. Leaves about 2 pairs, within an inch of the base, suberect. Peduncles 1–4, divided into compound cymes. Ultimate pedicels with some gland-tipped hairs. Calyx-lobes linear or linear-oblong, $\frac{1}{8}$ in. long, hairy, not gland-tipped. Anther-cells hardly confluent. Ovary hairy.

Corolla $\frac{2}{3}$ in. long. Leaves thin . . . . . 6. *S. montana.*
Corolla $\frac{3}{4}$–1 in. long. Leaves shaggy on nerves . . 7. *S. hirtinervis.*

§ 3. *Caulescentes.*—Stem 4–30 in. long, with internodes up to 1–6 in. long, often branched. Leaves in opposite pairs, lower long petioled, uppermost often approximate and subsessile. Peduncles solitary, axillary, 1–5 in. long, carrying paniculate cymes; sometimes 4–6 apparently umbellate, *i.e.*, one from each axil of the 2–3 pairs of the crowded uppermost leaves.

* Ovary glabrous, or sparsely and minutely hairy; the young capsule glabrous or very early glabrescent.
  Ovary glabrous. Corolla blue or violet; tube subcylindric.
    Calyx-lobes ovate or elliptic, not linear nor acute.
      Leaves closely hairy; calyx-lobes not gland-tipped . . . . . 8. *S. caulescens.*

Leaves thinly hairy; calyx-lobes gland-tipped . . . . . 9. *S. Holstii.*
Calyx-lobes lanceolate or linear-lanceolate.
Calyx-lobes gland-tipped. Leaves 2–2½ in. long.
Leaves everywhere hairy . . . . 11. *S. rivularis.*
Nerves of leaves beneath prominent, hairy . 10. *S. ovata.*
Calyx-lobes not gland-tipped. Leaves 3–4 in. long . . . . . 15. *S. glandulosissima.*
Ovary without hairs, but with many minute gland-headed papillæ. Corolla blue; tube funnel-shaped, curved . . . . . 14. *S. Kirkii.*
Ovary when young with few scattered multicellular hairs, early glabrate. Calyx-lobes oblong-linear, gland-tipped. Corolla nearly white .
Leaves 1½ in. long. Corolla ⅔–¾ in. long . . 12. *S. pallidiflora.*
Leaves 3–4 in. long. Corolla ⅖ in. long . . 13. *S. elongata.*

** Ovary densely hairy. Capsule, until fully ripe, densely hairy.
Peduncles several- (or many-) flowered.
Corolla more than 1 in. long; tube much widened towards the top, curved . . . . 16. *S. balsaminoides.*
Corolla less than 1 in. long; tube subcylindric, nearly straight.
Species of East Africa.
Leaves rounded at the base.
Calyx-lobes oblong, subacute, gland-tipped . . . . . 17. *S. Volkensii.*
Calyx-lobes having a linear tip ended by a gland . . . . . 18. *S. ruwenzoriensis.*
Calyx-lobes ovate; tip triangular without a gland . . . . . 20. *S. Smithii.*
Leaves elongate, narrowed at the base . 19. *S. Buchanani.*
Species of West Africa.
Nerves of leaves 10 pairs; calyx ⅛–⅙ in. long . . . . . 21. *S. nobilis.*
Nerves of leaves 18 pairs; calyx ⅕–¼ in. long . . . . . 22. *S. lagosensis.*
Peduncles 1-flowered . . . . . 23. *S. Saxorum.*

1. **S. Mahoni,** *Hook. f. Bot. Mag. t.* 7857. Stemless. Leaf (permanent cotyledon) 1, subsessile, 15 by 12 in., crenate, hairy on both surfaces; nerves 12 pairs. Peduncles 3–5, hairy, 2–4 in. long; flowers numerous in a rather close much-branched cyme; bracts at the divisions ⅓–⅔ in. long, lanceolate or 0; pedicels often 1 in. long and upwards, hairy. Calyx-segments ¼ in. long, linear, hairy, without a gland at the tip. Corolla ¾–1 in. long, blue; tube ½ in. long, subcylindric, curved; two lobes of limb very unequal. Filaments hardly dilated, with a very few gland-tipped hairs in the upper part. Ovary and style very hairy. Capsule (not ripe) 1½ by ⅛ in., very hairy.

Mozamb. Dist. British Central Africa: Nyasaland, cultivated specimen, *Mahon!*

2. **S. tubiflos,** *C. B. Clarke in Dyer, Fl. Cap.* iv. ii, 441. Stemless. Leaf (permanent cotyledon) 1, subsessile, 12 by 7 in., crenate, hairy on both surfaces; nerves 20–30 pairs. Peduncles 1–3, hairy, 3–12 in. long; flowers numerous in a rather close much-branched cyme; bracts at the divisions $\frac{1}{4}$ in. long, lanceolate, few or often 0; pedicels often 1 in. long and upwards, hairy. Calyx-segments scarcely $\frac{1}{8}$ in. long, linear, hairy, without a gland at the tip. Corolla $1\frac{1}{4}$ in. long, pale blue; tube $\frac{2}{3}$ in. long, cylindric, hairy; corolla-lobes 5, oblique, two much shorter. Filaments dilated, with many gland-tipped hairs at the top; pollen globose, 15 μ in diam. Pistil densely grey hairy, without (or with very few) gland-tipped hairs. Capsule 3 by $\frac{1}{10}$ in.— *S. Cooperi,* C. B. Clarke in DC. Monogr. Phan. v. 150, partly; Engl. in Engl. Pfl. Ost-Afr. C. 362.

Mozamb. Dist. British Central Africa: Nyasaland; Shire Highlands, *Buchanan,* 99! and without precise locality, *Buchanan,* 1088!

Also in Natal.

This plant resembles *S. Saundersii.* Hook. f., which has a wider corolla-tube somewhat funnel-shaped at the top, leaves with fewer wider-apart nerves, and ellipsoid pollen.

3. **S. breviflos,** *C. B. Clarke in Dyer, Fl. Cap.* iv. ii. 443. Corolla less than $\frac{2}{3}$ in. long; tube scarcely $\frac{2}{5}$ in. long; otherwise as *S. tubiflos.*— *S. Saundersii,* var. *breviflos,* C. B. Clarke in DC. Monogr. Phan. v. 150.

Mozamb. Dist. British Central Africa: Nyasaland; Namasi, *Cameron,* 20! Zomba, *Whyte!* and without precise locality, *Buchanan,* 108! 882!

Also in South Africa.

4. **S. benguelensis,** *C. B. Clarke in DC. Monogr. Phan.* v. 150. Stemless. Leaf (permanent cotyledon) 1, subsessile, 12 by 7 in., crenate, shaggy above, very hairy beneath. Peduncles many-flowered. Flowers violet-blue, as large as those of a fox-glove. Calyx-lobes $\frac{1}{6}$ in. long. Capsule $1\frac{1}{4}$–2 in. long, hairy.—Fritsch in Engler & Prantl, Pflanzenfam. iv. 3 B. 151. *S. monophylla,* Welw. in Archiv. Genève, xi. (1861), 202; Hiern in Cat. Afr. Pl. Welw. i. 789.

Lower Guinea. Angola: Benguela; Monino River, *Welwitsch,* 1660!

Flowers not seen. Hiern says this species differs from *S. Cooperi* mainly by the pubescence on the corolla; the leaf appears much stouter and more shaggy, the peduncle stouter and more hairy. It is close to *S. Cooperi;* and, from the large size of the corolla, differs from *S. breviflos.*

5. **S. katangensis,** *De Wild. & Durand in Bull. Soc. Bely.* xl. 25. Stemless. Leaf solitary, 4 in. broad, densely tomentose on both surfaces. Peduncles 1 in. long, carrying compound many-flowered cymes. Calyx-lobes $\frac{1}{6}$–$\frac{1}{5}$ in. long, linear. Corolla violet, densely hairy; tube $\frac{2}{3}$ in. long; limb very unequally 2-lipped. Ovary silky.—De Wild. Etudes Fl. Katanga 127.

South Central. Congo Free State: Katanga; Lukafu, *Verdick,* 249.

6. **S. montana,** *Oliver in Trans. Linn. Soc. ser.* 2, *Bot.* ii. 344. Stem hardly any. Leaves 3–5; blade 6 by 1–3 in., lanceolate or obovate; attenuate into a petiole $\frac{1}{8}$–$\frac{1}{2}$ in. long, serrate-crenate, hairy on both surfaces; nerves 18 pairs; peduncles several, 4–8 in. long, several-flowered or many-flowered; bracts at the divisions of cyme $\frac{1}{8}$–$\frac{1}{4}$ in. long, lanceolate, or more often wanting; pedicels $\frac{1}{2}$ in. long, hairy, many of the hairs gland-tipped. Calyx-lobes $\frac{1}{8}$–$\frac{1}{10}$ in. long, oblong, hairy, without a gland at the tip. Corolla $\frac{2}{3}$ in. long, mauve; tube $\frac{2}{5}$ in. long, broad, dilated from the base. Filaments glabrous, not dilated. Ovary very hairy; upper half of style glabrous. Capsule 1 by $\frac{1}{16}$ in.—Engl. Hochgebirgsfl. Trop. Afr. 386, and Pfl. Ost-Afr. C. 363; Fritsch in Engl. & Prantl, Pflanzenfam. iv. 3 B., 151.

Nile Land ? East Tropical Africa: *Taylor!*

Mozamb. Dist. German East Africa: Kilimanjaro, 6300–7000 ft., *Johnston*, 157! *Volkens*, 1295!

7. **S. hirtinervis,** *C. B. Clarke.* Stem hardly any. Leaves 3–5; blade 4–5 by 2 in., narrowed at the base into a short petiole or some rounded and subsessile, toothed on margin, hairy on both surfaces; nerves 15 pairs, those of the lower surface conspicuously shaggy with glistening white or brownish hair. Peduncles 3–5 in. long, hairy, many of the hairs gland-tipped; cyme compound rather dense; bracts very small; pedicels in flower $\frac{1}{2}$ in. long. Calyx-lobes $\frac{1}{8}$–$\frac{1}{6}$ in. long, oblong-linear, hairy; tip eglandular. Corolla $\frac{3}{4}$–1 in. long, violet-blue (from the dried example); tube $\frac{1}{2}$ in. long, cylindric, curved, slightly dilated at the top. Filaments glabrous, not dilated, Ovary very hairy; style hairy nearly to the top. Capsule seen very immature.

Mozamb. Dist. British Central Africa: Nyasaland; Mount Mlanji, 7000–9000 ft., *Purves*, 91! Mount Malosa, 6000–10,000 ft., *Whyte!*

This species is closely allied to the South African *S. parviflora*, E. Meyer.

8. **S. caulescens,** *Vatke in Linnæa*, xliii. 323. Stem 8–12 in. long. Leaves (blade) $2\frac{1}{2}$ by $1\frac{1}{4}$ in.; base rounded, narrowed or unequal; tip triangular, obtuse; margin subentire; nerves 10 pairs; both surfaces hairy; petiole 1 in. long. Peduncles axillary, $3\frac{1}{2}$ in. long, carrying a panicled ebracteolate loose cyme; pedicels nearly glabrous, in fruit $\frac{1}{4}$–$\frac{1}{2}$ in. long. Calyx scarcely $\frac{1}{8}$ in. long, purplish in the dried plant; lobes elliptic-oblong, subobtuse, sparsely hairy, without a gland at the tip. Corolla $\frac{2}{3}$ in. in total length, deep purple-blue in the dried plant; tube $\frac{1}{3}$ in. long, cylindric; two lobes of limb very unequal. Filaments hardly dilated, glabrous. Ovary and style glabrous or very nearly so. Capsule $1\frac{1}{2}$ by $\frac{1}{10}$ in.—Engl. in Engl. Pfl. Ost-Afr. C 363; not of C. B. Clarke in DC. Monogr. Phan. nor of Hook. f.

Nile Land. British East Africa: Teita, ex *Engler.*

Mozamb. Dist. German East Africa: Usambara, *Holst*, 3387! *Buchwald*, 378! British Central Africa: Shire Valley, ex. *Engler.*

S. caulescens, Vatke, was the first species known of this group, collected in Teita; and Vatke's description is insufficient to distinguish it among the numerous

closely-allied species since described. Not having the "type" of Vatke, I have described above as "*S. caulescens*, Vatke"—Holst 3387—an excellent specimen, determined by Engler. Vatke, however, says "calyx hairy, lobes linear, rather acute," which does not agree with the calyx of Holst, 3387, and would point rather to *S. rivularis*, Engl., as the original *caulescens*.

9. **S. Holstii,** *Engl. in Engl. Jahrb.* xviii. 77, *t.* 4–5, *fig. C.* More slender and less hairy than *S. caulescens*, Vatke. Leaves sparsely hairy, in Holst 2253 less than 1 in. long; but, from Engler's description and plate, sometimes 2 in. long. Calyx-lobes elliptic-oblong, ending in an ovoid gland, very sparsely hairy. Corolla, stamens, pistil, capsule, as of *S. caulescens*, Vatke; to which *S. Holstii* must be very near.—Engl. in Engl. Pfl. Ost-Afr. C. 363.

Mozamb. Dist. German East Africa: Usambara; Derema, *Holst*, 2233!

10. **S. ovata,** *C. B. Clarke.* Internodes of stem long, and somewhat swollen. Leaves up to $2\frac{1}{2}$ in. long, ovate-elliptic, nerves prominent on the lower surface. Peduncles 3–6 in. long; cyme straggling, thin; ultimate branches slender, sparingly glandular-hairy. Calyx-segments $\frac{1}{8}$ in. long, oblong-linear, gland-tipped, glabrate or very sparsely hairy. Corolla, stamens, pistil, seeds, as of *S. caulescens* and *S. Holstii.*—*S. caulescens*, var. *ovata*, C. B. Clarke in DC. Monogr. Phan. v. 154.

Mozamb. Dist. German East Africa: Usambara; Magila, *Kirk!*

11. **S. rivularis,** *Engl. in Engl. Jahrb.* xviii. 78, *tt.* 4–5, *fig. D.* Leaves 2–$2\frac{1}{2}$ in. long, oblong, 6–8-nerved, covered everywhere with short grey hairs. Calyx-lobes $\frac{1}{10}$ in. long, lanceolate, gland-tipped, white hairy. Corolla $\frac{3}{5}$ in. long; tube $\frac{1}{4}$ in. long; otherwise as *S. caulescens*, Vatke.—Engl. in Engl. Pfl. Ost-Afr. C. 363.

Mozamb. Dist. German East Africa: Usambara; Mlalo, *Holst*, 342.

The description of this species would suggest that this was the true *S. caulescens*, Vatke. The present 4 species, n. 8–11 inclusive, all agree in essentials and come from Usambara; it is possible with ample material they may hereafter be reduced to one, but the examples to hand at present do not match.

12. **S. pallidiflora,** *C. B. Clarke.* Stem erect, 4–8 in. long; some of the internodes much swollen, both in the cultivated plant and in Volkens 1006. Leaves (blade) $1\frac{1}{2}$ by 1 in., elliptic or ovate, nearly entire, hairy on both surfaces, rounded or oblique at the base; nerves 9 pairs; petioles $\frac{1}{4}$–$\frac{3}{4}$ in. long. Peduncles axillary, 3 in. long, carrying an elongate loose apparently simple panicle; bracts at the divisions $\frac{1}{6}$ in. long, linear (mostly 0); pedicels $\frac{3}{4}$ in., nearly glabrous. Calyx $\frac{1}{8}$ in. long; lobes oblong-linear, gland-tipped, with few many-celled hairs. Corolla $\frac{2}{3}$–$\frac{3}{4}$ in. long, white; tube $\frac{1}{3}$ in. long, scarcely dilated; limb of 2 unequal lips. Filaments glabrous, slightly dilated. Ovary with few scattered many-celled hairs; style glabrous. Capsule $1\frac{1}{2}$ in. long, very early glabrate.—*S. caulescens*, Hook. f. Bot. Mag. t. 6814; Nichols. Dict. Gard. iii. 516; *S. caulescens*, var. *pallescens*, Engl. in Engl. Jahrb. xix. 154.

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, *Volkens*, 1006! and without precise locality (cultivated at Kew), *Hannington!*

This differs from the rest of the group of *S. caulescens*, Vatke, by the sparsely hairy ovary and the white corolla.

13. **S. elongata,** *Engl. in Engl. Jahrb.* xviii. 76, *tt.* 4–5, *fig. A.* Rhizome horizontal (*Engler*). Stem 18 in. long, erect, internodes long. Leaves (blade) 2½–5 in. long, ovate or elliptic, rounded or unequal at the base, thin, sparsely hairy on both surfaces; margins nearly entire; nerves 10 pairs; petioles 1–4 in. long; uppermost leaves approximate, subsessile. Peduncles 2 in. long, with gland-tipped hairs, often 2–3 times divided; ultimate pedicels ¼–½ in. long; bracts at the divisions ⅕ in. long, elliptic. Calyx ⅛–$\frac{1}{10}$ in. long; lobes oblong-linear, gland-tipped, sparsely hairy or glabrate. Corolla ⅔ in. long, white; tube narrowly funnel-shaped. Filaments glabrous, slightly dilated. Ovary (young) and style thinly hairy with many-celled hairs. Capsule 2 by $\frac{1}{12}$ in., early glabrate.

Upper Guinea. Cameroons: Buea, 3300 ft., *Preuss*, 1010!

14. **S. Kirkii,** *Hook. f. Bot. Mag. t.* 6782. Stem erect, 4½ in. high, excluding peduncles. Leaves (blade) 1¼ in. long, elliptic, rounded at either end, crenulate, somewhat hairy on both surfaces; nerves 6 pairs; petioles ½ in. long. Peduncles 3½ in. long, carrying a loose compound cyme; pedicels ½ in. long, nearly glabrate; bracts hardly ⅙ in. long, linear. Calyx $\frac{1}{10}$ in. long; lobes oblong, gland-tipped, nearly glabrous. Corolla ½–⅔ in. long, blue; tube funnel-shaped, curved; limb very oblique; lobes not very unequal. Filaments with glandular hairs near the top. Ovary covered with distant minute gland-tipped papillæ; style glabrous. Capsule 1½ in. long, glabrous.—Nichols. Dict. Gard. iii. 516.

Mozamb. Dist. Specimen cultivated at Kew, from Zanzibar, *Kirk!*

15. **S. glandulosissima,** *Engl. in Engl. Jahrb.* xviii. 78, *tt.* 4–5, *fig. E.* Stem 20 in. long, weak, very sparsely hairy. Leaves (blade) 3–4 in. long, elliptic or ovate, rounded at the base, very sparsely hairy on both surfaces, thin; nerves 11 pairs; margin subentire; petioles 1–3 in. Peduncle 4 in. long, hairy; cyme-branches densely glandular-hairy; pedicels in flower short. Calyx nearly ⅙ in. long; lobes lanceolate, acute, without a gland at the tip, with many gland-tipped hairs. Corolla ⅔–¾ in. long; tube cylindric, shorter than the violet limb of two very unequal lobes. Ovary and style glabrous. Capsule 2 in. long (*Engler*).

Mozamb. Dist. German East Africa: Usambara; Mtai, *Holst*, 2472!

16. **S. balsaminoides,** *Engl. in Engl. Jahrb.* xviii. 77, *tt.* 4–5, *fig. B.* Stem 1–2 ft. long. Leaves (blade) 2–3 by 1–1½ in., ovate or elliptic, rounded at the base, uniformly hairy on both surfaces; nerves 15 pairs; margin minutely crenate-serrate; petioles ¾ in. long.

Peduncles 4 in. long; cymes trichotomous, many-flowered; branches with many hairs, few gland-tipped; bracts $\frac{1}{8}$ in. long, oblong. Calyx $\frac{1}{8}$ in. long; lobes elliptic, narrow-oblong, gland-bearing at the tip, densely hairy with many-celled hairs, few gland-tipped. Corolla more than 1 in. long; tube $\frac{2}{3}$ in. long, funnel-shaped at the top, curved; limb oblique, violet-blue. Filaments glabrous, winged. Ovary shaggy. Capsule $1\frac{3}{4}$ in. long, hairy.

Upper Guinea. Cameroons: Barombi, *Preuss*, 539!

Var. *β tenuifolia*, Engl. in Engl. Jahrb. xxvi. 363. Leaves thinner, up to 5–6 by $2\frac{1}{2}$ in., acute at the base, sparsely hairy.

Upper Guinea. Cameroons: Johan Albrechtshöhe, 700 ft., *Staudt*, 456.

17. **S. Volkensii,** *Engl. in Engl. Jahrb.* xix. 153. Stem 1–2 ft. long. Leaves (blade) 2–$2\frac{1}{2}$ by 1 in., elliptic or ovate, rounded at the base, hairy on both surfaces; margin subentire; nerves 8–10 pairs; petiole $\frac{1}{2}$–2 in. long. Peduncles 3–4 in. long, 7–13-flowered, with many gland-tipped hairs; pedicels $\frac{1}{3}$ in. long, glandular-hairy; bracts at the divisions $\frac{1}{16}$ in. long. Calyx $\frac{1}{8}$ in. long; lobes oblong, subacute, gland-tipped, and with many gland-tipped hairs. Corolla $\frac{2}{3}$–$\frac{3}{4}$ in. long, blue; tube $\frac{2}{3}$ in. long, subcylindric; lobes of the limb very unequal. Filaments hardly dilated, glandular near the top. Ovary hairy; style glabrous. Capsule 2 in. long.—Engl. in Engl. Pfl. Ost-Afr. C. 363. *Streptocarpi sp.*, Oliver in Trans. Linn. Soc. ser. 2, Bot. ii. 344.

Nile Land. Kilimanjaro, 6000 ft., *Johnston*, 104!

Mozamb. Dist. German East Africa: Kilimanjaro; Marangu, 4800 ft., *Volkens*, 589!

18. **S. ruwenzoriensis,** *Baker.* Stem 8–15 in. long. Upper leaves 2–$2\frac{1}{2}$ in. long, elliptic, hairy on both surfaces; lower leaves 4 in. long, cordate-ovate. Peduncles 3–5 in. long, softly hairy but with few gland-tipped hairs. Calyx $\frac{1}{6}$ in. long; lobes oblong with a linear tip ending in a gland, with many soft hairs but hardly any gland-tipped. Corolla $\frac{3}{4}$ in. long, violet-blue. Capsule 2 in. long. Otherwise as *S. Volkensii.*

Nile Land. Uganda: Ruwenzori, 6000–7000 ft., *Scott-Elliot*, 7936! 7968! British East Africa: *Taylor! Doggett!*

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith!*

This species is closely allied to *S. Volkensii*, but is remarkable for the linear-tip to the calyx-lobes. The corolla also appears to have a longer tube, and a shorter limb, than that of *S. Volkensii.*

19. **C. Buchanani,** *C. B. Clarke.* Stems stout. Upper stem-leaves (blade) 4–5 in. long, broadly-lanceolate narrowed at both ends; nerves 12–15 pairs. Peduncles 5–6 in. long. Calyx-lobes not or obscurely gland-tipped. Corolla a lovely blue (*Buchanan*). Ovary shaggy; capsule very hairy, otherwise as *S. Volkensii*, Engl.—*S. caulescens*, C. B. Clarke in DC. Monogr. Phan. v. 154, not of Vatke.

Mozamb. Dist. Portuguese East Africa: mountains East of Lake Nyasa, *Johnson!* British Central Africa: Nyasaland; Shire Highlands, *Buchanan*, 410!

The statement "ovary glabrous" (in DC. Monogr. Phan. v. 154) is wrong so far as Buchanan 410 is concerned.

20. **S. Smithii,** *C. B. Clarke.* Stem-leaves (blade) 1¼ by ¾ in., rounded at the base, hairy on both surfaces; nerves 7–8 pairs. Calyx-lobes ovate, triangular at the tip which has no gland. Otherwise as *S. Volkensii*, Engl.

Mozamb. Dist. German East Africa: Usambara; Umba Valley, *Smith!*

The four species (17 to 20) are very closely allied.

21. **S. nobilis,** *C. B. Clarke in DC. Monogr. Phan.* v. 155. Stems up to 3 ft. high. Leaves (blade) 3–4 by 2 in., rounded at the base, thin membranous, sparsely pubescent on the upper surface, nearly glabrous on the lower; nerves 10 pairs; petioles 2 in. long. Peduncles forming an elongate panicle, 8 in. long; cymes many-flowered, much and loosely branched. Calyx ⅛–⅕ in. long; lobes nearly linear. Corolla ¾ in. long; tube subcylindric. Capsule 2 in. long, hairy.

Upper Guinea. Senegambia: Landouman Country, *Heudelot* 728!

22. **S. lagosensis,** *C. B. Clarke.* Stem 18 in. long. Leaves (blade) 5–6 by 2–2½ in., rounded or obtriangular at the base, sparsely hairy on the upper surface, nearly glabrous on the lower; margin crenulate-serrate; nerves 18 pairs; petiole 3½ in. long. Peduncles from axils less than 1 in. apart, so that the whole inflorescence is level-topped, 4 in. long; cymes laxly many-flowered; pedicels ¼–½ in. long, with many gland-tipped hairs. Calyx nearly ¼ in. long; lobes oblong-linear without a gland at the tip, with many gland-tipped hairs. Corolla ⅔ in. long (perhaps more), violet-blue; tube subcylindric. Filaments cylindric, glabrous; pollen 40 by 20 μ, narrow-ellipsoid. Ovary very hairy; style with many gland-tipped hairs. Capsule (not ripe) 2 in. long, hairy.

Upper Guinea. Lagos: specimen cultivated at Kew from seeds collected "100 miles above Lagos" *Foster!*

23. **S. Saxorum,** *Engl. in Engl. Jahrb.* xix. 154. Small undershrub; stem becoming almost woody, glabrate. Leaves (blade) ¾–1 by ⅓ in., thick, very hairy on both surfaces; margin subentire; base often cuneate; nerves 6 pairs; petioles ⅛–¼ in. long. Peduncles from the upper axils solitary, 5 in. long, 1-flowered, nearly glabrous. Calyx $\frac{1}{10}$ in. long; lobes ovate, not tipped by a gland, clothed by many many-celled hairs, few gland-tipped. Corolla 1¼ in. long, blue; tube ½ in. long, subcylindric; 3-lobed lip much exceeding the 2-lobed lip. Filaments glabrous not dilated. Ovary very hairy. Capsule 2 in. long—Engl. in Engl. Pfl. Ost-Afr. C. 363, t. 43, fig. K—M.

Mozamb. Dist. German East Africa: Usambara, *Holst*, 3388! Kwa Chiropa, *Hannington!*

7. **LINNÆOPSIS,** Engl. in Engl. Jahrb. xxviii. 482, t. 5.

Calyx small, deeply 5-lobed. Corolla wide-campanulate from the base; limb oblique, unequally 5-fid. Stamens on the corolla, 2 anterior fertile; anthers 2, short, confluent. Disc oblique. Ovary oblong obovoid, 2-celled; placentas parietal, not meeting in the centre of the ovary; ovules very many. Stigma capitate. Ripe fruit not known.—A creeping herb. Leaves distant, all (or nearly all ?) alternate. Peduncles solitary from the leaf-axils, 1–7-flowered; bracts at the divisions of the cyme very small.

Species 1, endemic.

1. **L. heckmanniana,** *Engl. in Engl. Jahrb.* xxviii. 483, *t.* 5. Stems 8 in. long, dividing, rooting at the nodes. Leaves (blade) round-ovate $\frac{3}{4}$ in. in diam., cordate, crenate, purplish on lower surface, thickly clothed on both surfaces with white one-celled hairs; nerves 5–6 pairs; petiole $\frac{1}{2}$ in. long. Peduncles 3 in. long, clothed with many-celled gland-tipped hairs; bracteoles hardly $\frac{1}{12}$ in. long, oblong; pedicels $\frac{1}{2}$ in. long. Calyx $\frac{1}{8}$ in. long; lobes ovate-oblong, glandular-hairy. Corolla white, $\frac{3}{5}$ in. long, glandular-hairy. Stamens as of *Streptocarpus.* Ovary glandular-hairy, in the figure, oblong, $\frac{1}{3}$ by $\frac{1}{10}$ in.—General appearance as of *Linnæa borealis,* Linn.

Mozamb. Dist. German East Africa: Uluguru; Lukwangula Plateau, 5000–6000 ft., *Goetze,* 251.

ORDER XCVI. **BIGNONIACEÆ.** (By T. A. Sprague).

Flowers hermaphrodite, usually more or less irregular. Calyx inferior, gamosepalous, truncate, lobed or spathaceous. Corolla gamopetalous; tube campanulate, funnel-shaped or tubular, often pilose at the insertion of the stamens; limb bilabiate, the 2-lobed posticous lip usually overlapping the 3-lobed anticous lip in bud, more rarely regular. Stamens inserted on the corolla-tube, 4, didynamous, with a posticous staminode, or 5, equal, very rarely 2; filaments filiform or flattened, often thickened at the base; anthers introrse, dehiscing longitudinally; lobes attached at the apex, parallel, divergent or divaricate. Disc hypogynous, cushion-shaped, annular or cupular, rarely absent. Ovary 2-celled or, more rarely, 1-celled with 2 parietal, often much intruded placentas; ovules numerous, anatropous; style simple, filiform; stigma of 2 flattened lobes. Fruit a 2-valved loculicidal or septifragal capsule, or fleshy and indehiscent. Seeds usually flat with a broad, often hyaline wing; embryo usually enveloped in a fine interior membrane (*tegmen*); albumen none; cotyledons flattened, rarely folded; radicle short, lateral (very rarely superior).—Trees or shrubs, frequently twiners or climbers, very rarely herbs. Leaves opposite, more rarely whorled or alternate, usually compound with articulated leaflets, often cirrhiferous; stipules

absent, but closely simulated in certain genera by the first or first and second pairs of leaves of the axillary bud (*pseudostipules*). Inflorescence a panicle or raceme (simple or with cymose ultimate branching), terminal or axillary; flowers sometimes borne on the old wood, often large, abundant and brightly coloured.

Genera about 105, many of them monotypic; species about 550, mostly Tropical American.

For the sake of convenience the "length" of the seed is here taken as its longest measurement, viz., that parallel to the longitudinal axis of the capsule; the "ends" of the seed are the sides facing the top and bottom of the capsule.

TRIBE I. **Tecomeæ.**—*Ovary 2-celled. Fruit a loculicidal capsule. Seeds winged.*

Stamens 4, didynamous, with a posticous staminode.
Calyx not spathaceous.
Ovules 4–8-seriate in each cell; septum of capsule flat.
Calyx regular, with 5 equal lobes, opening early in bud.
Stamens exserted; upper third of anther-lobes connate . . . . . 1. TECOMARIA.
Stamens included; anther-lobes free from each other except at the very apex . . 2. PODRANEA.
Calyx irregular, with 3–4 unequal lobes, opening late in bud . . . . . 3. FERDINANDIA.
Ovules 2-seriate in each cell; septum cylindric, with deep pits in which the seeds are fitted . 4. STEREOSPERMUM.
Calyx spathaceous.
Calyx split down the anticous side; ovules 2-seriate in each cell . . . . . 5. NEWBOULDIA.
Calyx split down the posticous side; ovules 4- to multi-seriate in each cell.
Ovules 4–6-seriate; valves of capsule flat. . 6. MARKHAMIA.
Ovules multiseriate; valves boat-shaped . . 7. SPATHODEA.
Stamens 5, all perfect.
Calyx campanulate; fruit smooth . . . . 8. RHIGOZUM.
Calyx tubular; fruit warted . . . . . 9. CATOPHRACTES.

TRIBE II. **Crescentieæ.**—*Ovary 1-celled. Fruit indehiscent. Seeds not winged.*

Only Tropical African genus . . . . . 10. KIGELIA.

1. TECOMARIA, Spach; Sprague in Dyer, Fl. Cap. iv. ii. 448.

Calyx opening early in bud, regular, tubular-campanulate, 5-lobed. Corolla-tube narrowly funnel-shaped or almost cylindric, curved forwards; limb markedly bilabiate. Stamens 4, exserted; anther-lobes connate for the upper third, divergent below. Disc cupular. Ovules 4-seriate in each cell. Capsule oblong-linear, much compressed parallel to the septum.—Shrubs with simply imparipinnate leaves and dense terminal racemes of orange or scarlet flowers.

Species 3, 1 of them also in South Africa.
Calyx 2–3½ lin. long . . . . . 1. *T. capensis*.
Calyx 5–9 lin. long.

Leaflets 5–7, elliptic, obtuse, mucronulate . . 2. *T. Nyassæ.*
Leaflets 9–13, ovate, acutely acuminate . . . 3. *T. shirensis.*

1. **T. capensis,** *Spach, Hist. Veg. Phan.* ix. 137. A rambling shrub, about 6 ft. high. Branches subterete, minutely pubescent above, glabrescent below. Leaves opposite, short-petioled, 2–5 in. long; leaflets 5–9 (rarely 3), shortly stalked, elliptic, orbicular or rhomboidal, more or less oblique at the base, 6–15 lin. long, 4–9 lin. broad, (terminal leaflet ovate, acuminate, 9–23 lin. long, 6–13 lin. broad, its petiole up to 6 lin. long), crenate, sometimes mucronulate, glabrescent above, pilose in the axils of the veins below. Racemes of numerous 3-flowered cymes, or sometimes simple in the upper part; peduncle $1\frac{1}{2}$–4 in. long, usually overtopping the leaves; rhachis and pedicels finely pubescent; bracts linear-subulate, caducous. Calyx 2–$3\frac{1}{2}$ lin. long, strongly ribbed, finely pubescent; tube $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long; lobes deltoid, apiculate or acuminate, $\frac{1}{2}$–1 lin. long, ciliate. Corolla orange-red or scarlet; tube laterally compressed, 1–$1\frac{1}{2}$ in. long; lobes ovate, obtuse, rather under $\frac{1}{2}$ in. long, ciliate. Capsule 3–5 in. long, 4–5 lin. broad, apiculate.—Seem. in Journ. Bot. 1863, 21; Baill. Hist. Pl. x. 41; K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B, 230, and in Mart. Fl. Bras. viii. ii. 307; Schinz in Mém. Herb. Boiss. No. 10, 62; Sprague in Dyer, Fl. Cap. iv. ii. 448. *Tecomaria Krebsii,* Klotzsch in Peters, Reise Mossamb. Bot. 193. *T. Petersii,* Klotzsch, l.c. 192. *Bignonia capensis,* Thunb. Prodr. 105; Pers. Syn. ii. 172. *Tecoma capensis,* Lindl. Bot. Reg. t. 1117; DC. Prodr. ix. 223; Drège, Zwei Pflanzengeogr. Documente, 136, 142, 156, 160; Harvey, Gen. S. Afr. Pl. ed. i. 235, and ed. ii. 275; Schinz in Bull. Trav. Soc. Bot. Genéve, vi. (1891) 70; A. Zahlbruckner in Ann. Mus. Wien, xv. (1900) 70; Wood, Natal Plants, iii. 3, 24, t. 272. *Ducoudrea capensis,* Bur. Monogr. Bignon. 49, 145.

Mozamb. Dist. Transvaal: Zoutspans Berg; Elim, *Mingard & Creux.*
A South African species which just crosses the Tropic of Capricorn.

2. **T. Nyassæ,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 363. Branches roughly quadrangular, minutely pubescent. Leaves opposite, long-petioled, 4–5 in. long; leaflets 5–7, very shortly stalked, elliptic, obtuse, 8–20 lin. long, 5–14 lin. broad, mucronulate, irregularly crenate-serrate, glabrous above, lower surface with tufts of hairs in the axils of the veins; lateral leaflets oblique at the base. Racemes simple, dense; peduncle 6 in. long, overtopping the leaves; rhachis and pedicels finely pubescent; bracts linear-subulate, caducous; pedicels 6 lin. long. Calyx 7–9 lin. long, glandular, finely pubescent; tube $4\frac{1}{2}$–$5\frac{1}{2}$ lin. long; lobes lanceolate, acuminate, $2\frac{1}{2}$–4 lin. long. Corolla-tube 1 in. long or more; lobes broadly ovate, obtuse, $\frac{1}{2}$ in. long.—K. Schum. in Engl. Jahrb. xxviii. 480. *Tecoma Nyassæ,* Oliv. in Hook. Ic. Pl. t. 1351.

Mozamb. Dist. German East Africa: lower plateau, north of Lake Nyassa *Thomson!* Uhehe: Higulu Plateau, northern Uchungwe Mountains, *Goetze,* 566.

3. **T. shirensis,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 363 (*T. schirensis*). A shrub, 4–10 ft. high. Branches subterete or roughly angled, minutely pubescent. Leaves opposite or ternate, long-petioled, 4–9 in. long; leaflets 9–13, distinctly stalked, ovate, acutely acuminate, 9–33 lin. long, 4½–15 lin. broad, serrate, glabrous above, lower surface with tufts of hairs in the axils of the glabrescent veins; lateral leaflets oblique or rounded at the base. Racemes dense, simple or bearing 3-flowered cymes below; peduncle 2–4½ in. long, equalling or overtopping the leaves; rhachis and pedicels pubescent; bracts linear-subulate, caducous; pedicels 3–4 lin. long. Calyx 5–7 lin. long, slightly pubescent; tube 3½–4½ lin. long; lobes deltoid or ovate-deltoid, acuminate, 2–3 lin. long. Corolla orange; tube about 1 in. long; lobes broadly ovate, obtuse, ½ in. long. Capsule 4½ in. long, ½ in. broad, beaked.—*Tecoma shirensis*, Baker in Kew Bulletin, 1894, 30; Sprague in Bot. Mag. t. 7970. *T. Whytei*, C. H. Wright in Kew Bulletin, 1897, 275. *T. nyikensis*, Baker in Kew Bulletin, 1898, 159.

Mozamb. Dist. German East Africa: (a pubescent form), *Busse*, 174! British Central Africa: Nyasaland, 2000–7000 ft.; Luagwa River, *McClounie*, 149! Nyika Plateau, *Whyte*, 112! between Mpata and commencement of Tanganyika Plateau, *Whyte!* Shire Highlands, *Buchanan*, 219! 925! Zomba Plateau, *Whyte!* Mount Malosa, *Cameron*, 13! Tuchila Plateau, on Mount Mlanji, *Purves*, 15!

2. **PODRANEA**, Sprague in Dyer, Fl. Cap. iv. ii. 449.

Calyx opening early in bud, regular, campanulate, 5-lobed, inflated. Corolla campanulate above, narrowed to a cylindric tube below; limb slightly bilabiate; lobes subequal, spreading. Stamens 4, included; anther-lobes free except at the very apex, divaricate when mature. Disc cupular. Ovules 8-seriate in each cell. Capsule linear, scarcely compressed.—Shrubs and undershrubs with opposite, simply imparipinnate leaves and terminal panicles of pink or lilac flowers.

Species 2, the other one in South Africa.

1. **P. Brycei,** *Sprague.* A nearly glabrous, scandent undershrub, about 1½ ft. high. Stem slender, quadrangular, finely ribbed, minutely lepidote in the grooves, pubescent at the nodes. Leaves from 4 in. long upwards; leaflets 9–11, stalked, ovate or ovate-lanceolate, long acuminate, 9–21 lin. long, 3–6 lin. broad, slightly serrate, obscurely glandular on the lower surface, otherwise glabrous. Panicle terminal, lax, 3–4 in. long; branches short, 3-flowered. Calyx campanulate, minutely and densely lepidote, the upper part glandular; tube 4–6 lin. long and broad; lobes ovate-deltoid, 3–4 lin. long, mucronate, reflexed on or before the opening of the corolla. Corolla pale mauve, glabrous outside, villous inside at the throat and the insertion of the stamens; tube 15–18 lin. long, 9 lin. in diam. at the throat, abruptly campanulate above; lower cylindric portion 3½–4 lin. long; lobes suborbicular, 6–11 lin. long, ciliate. Anther lobes elliptic-oblong, 1½ lin. long. Capsule up to 1 ft. long, 7 lin. broad. Seeds 7 lin. long, 5–5½ lin. broad.—*Tecoma Brycei*, N. E. Brown in Kew Bulletin, 1901, 130.

Mozamb. Dist. Mashonaland: in dry places, 4500 ft., *Bryce!* Rhodesia: Buluwayo, near streams, *Franklin White!*

Closely allied to *P. ricasoliana*, Sprague, from which it differs in the early reflexed calyx-lobes and the smaller, more abruptly campanulate corolla, which is villous within, and has the basal cylindric portion included in the calyx-tube.

3. **FERDINANDIA,** Welw. ex Seem. in Journ. Bot. 1865, 330.

Calyx opening late in bud, campanulate, unequally 3–4-lobed. Corolla broadly campanulate, narrowed below to a short cylindric or constricted portion; limb slightly bilabiate. Stamens 4, slightly exserted from the corolla-tube; anther-lobes divaricate. Disc cupular. Ovules pluriseriate in each cell. Capsule cylindric, spirally twisted; septum thick, flattened. Seeds oblong, winged at the ends.—Trees or shrubs. Leaves opposite, imparipinnate. Flowers large in axillary corymbose cymes produced after the fall of the subtending leaves.—*Fernandoa*, Seem. in Journ. Bot. 1866, 123. *Ferdinandoa*, Seem. l.c. 1870, 280. *Ferdinanda*, Benth. et Hook. f. Gen. Pl. ii. 1047. *Fernandia*. Baill. Hist. Pl. x. 47. K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 243.

Species 2, endemic.

The Asiatic genus *Heterophragma*, to which *Ferdinandia* has been reduced by certain authors, differs in having a terminal inflorescence and an annular disc.

Calyx and lower surface of leaflets pubescent or tomentose; peduncle very short	1. *F. superba.*
Calyx and lower surface of leaflets glabrous (disregarding glands); peduncle long	2. *F. magnifica.*

1. **F. superba,** *Welw. ex Seem. in Journ. Bot.* 1865, 330, *tt.* 37–38. A tree, 25–40 ft. high, almost leafless at the time of flowering. Young shoots and leaves finely and densely pubescent. Leaves up to 1 ft. long; rhachis pubescent; leaflets 7–13, shortly petioled, elliptic-oblong, shortly acuminate, unequally cuneate at the base, 1–4 in. long, 9–26 lin. broad, finely reticulate and glabrescent above, finely and densely pubescent below. Cymes axillary, corymbose, 5–9-flowered, 2 in. long excluding the flowers, finely tomentose; pedicels under 2 in. long. Buds ellipsoidal. Calyx tomentose outside with violet-purple hairs, glandular; tube 5–7 lin. long; lobes ovate-deltoid, subacute or mucronulate, 4–6 lin. long. Corolla orange-scarlet with blood-red stripes inside, puberulous outside; tube 1½ in. long, broadly campanulate above, constricted 2–3 lin. above the base; lobes 1 in. long. Stamens inserted 6 lin. above the base of the corolla-tube; anther-lobes 2 lin. long. Ovary 3–4 lin. long, greyish tomentose. Ovules arranged in 8 or more rows in each cell. Capsule cylindric-subulate, angular, spirally twisted, 2 ft. long; septum 2–3 lin. thick, 7 lin. broad. Seeds 1–1¼ in. long including the wings, 4–5 lin. broad.—Hiern, Cat. Afr. Pl. Welw. i. 792. *Bignonia Ferdinandi*, Welw. Apont. Phyto-geogr. 584. *Ferdinandoa superba*, Seem. in Journ. Bot. 1870, 280. *Fernandia superba*, Baill. Hist. Pl. x. 48. *Fernandia Fernandi*, K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 243, fig. 92 g. *Fernandia Ferdinandi*, K. Schum.

in Engl. Jahrb. xxxiii. 332, partly (as regards the synonymy, excluding East African localities). *Heterophragma Ferdinandi*, Britten in Journ. Bot. 1895, 75.

Lower Guinea. Angola: Golungo Alto; forest in Sobato de Bumba, at the base of Serra de Alto Queta, 2200 ft., *Welw tsch*, 488! and fruit, *Welwitsch*, 817; Sange, fruit, *Welwitsch*, 816.

The East African specimens referred here by Schumann in *Engl. Jahrb.* xxxiii. 332 probably belong to *F. magnifica*. Schumann seems to have overlooked the existence of *F. magnifica*; it is not mentioned in *Engl. & Prantl, Pflanzenfam.* iv. 3 B. 243, nor in *Engl. Pfl. Ost-Afr.*

2. **F. magnifica,** *Seem. in Journ. Bot.* 1870, 280 (*Ferdinandea magnifica*). A glabrous shrub. Leaves 1 ft. or more in length; leaflets 9–13, subsessile, ovate or ovate-oblong, rather long acuminate, unequally obtuse at the base, 1–5 in. long, 8–21 lin. broad, finely reticulate on both surfaces. Cymes axillary, corymbose, 4–10-flowered, 6–8 in. long excluding the flowers; pedicels 2–4 in. long. Buds oblong-ellipsoidal, apiculate. Calyx glandular outside; tube 5–6 lin. long; lobes ovate-deltoid, mucronulate, 3–5 lin. long. Corolla glabrous; tube 2 in. long or more, narrowed to a cylindric basal portion 2 lin. long; lobes 1 in. long. Stamens inserted 3 lin. above the base of the corolla-tube; anther-lobes 4–5 lin. long; filaments much flattened. Ovary 4 lin. long, glabrous. Ovules arranged in 4–6 irregular rows in each cell.—*Fernandoa magnifica*, Seem. in Journ. Bot. 1871, 81. *Fernandia Ferdinandi*, K. Schum. in Engl. Jahrb. xxxiii. 332, partly (as regards the East African localities, excluding synonymy). *Heterophragma longipes*, Baker in Kew Bulletin, 1894, 31.

Nile Land. British East Africa: near Mombasa, *Wakefield!*

Mozamb. Dist. German East Africa: Umba Valley, *Kässner*, 83! Lake Chidia, near the Rovuma River, *Kirk!*

4. STEREOSPERMUM, Cham.; Bureau in Adansonia, ii. 191; Benth. et Hook. f. Gen. Pl. ii. 1047, partly.

Calyx opening early in bud, campanulate or tubular, irregularly 2–5-lobed. Corolla campanulate-funnel-shaped or funnel-shaped; limb slightly bilabiate; lobes spreading. Stamens 4, didynamous, included (in *S. harmsianum*, the longer pair sometimes exserted); anther-lobes free, divergent. Disc annular or cupular, entire or lobed. Ovary oblong-linear or oblong, quadrangular. Ovules biseriate in each cell. Capsule linear, cylindric or 4-angled. Seeds winged at each end, nucleus ridged and fitting into a deep pit in the cylindric septum. Cotyledons folded.—Trees with imparipinnate leaves and terminal many-flowered panicles of pink, lilac or yellow flowers.

Species about 11, the others in Tropical Asia and Madagascar.

Calyx campanulate, $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long; bracts not foliaceous	1. *S. kunthianum.*
Calyx tubular, 6–$10\frac{1}{2}$ lin. long; bracts foliaceous.	
Calyx and leaflets glabrous	2. *S. acuminatissimum.*

Calyx and leaflets more or less pubescent or tomentose.	
Leaflets acuminate, puberulous or glabrescent above, pubescent below; calyx glabrous inside .	3. *S. Zenkeri.*
Leaflets not acuminate, tomentose on both surfaces; calyx puberulous and lepidote inside .	4. *S. harmsianum.*

1. **S. kunthianum,** *Cham. in Linnæa,* vii. 721. A tree, 15–45 ft. high; bark scaly, dark grey or whitish; branchlets very stout, striate or rugose. Leaves 6–14 in. long, glabrous, pubescent or tomentose; petiole 1–3½ in. long; leaflets 5–9, conspicuously stalked or subsessile, ovate or elliptic-oblong, more rarely suborbicular, obtuse (more rarely subacute) and usually shortly acuminate at the apex, obtusely cuneate or rounded at the base, 1½–5 in. long, ¾–1½ in. broad, entire or more or less serrate. Panicle usually ample, corymbose-pyramidal, glabrescent, pubescent or tomentose; bracts minute. Calyx campanulate, 2½–3½ lin. long, truncate or more or less 4–5-lobed, glabrous, pubescent or tomentose outside, often glandular; lobes rounded, up to 1 lin. long. Corolla pink or lilac with purple lines; tube funnel-shaped, 9–18 lin. long; ventral portion densely villous within; basal cylindric portion 1–2 lin. long; lobes 3–8 lin. long, ciliate. Stamens inserted 1½–3 lin. above the base of the corolla-tube; anthers oblong, 1–1⅜ lin. long. Disc annular, entire or lobed, ¼–⅝ lin. high. Ovary quadrangular, 2–3 lin. long, glabrous or minutely glandular. Stigma-lobes obovate or elliptic, entire, crenulate or dentate. Capsule cylindric, 1–2 ft. long, pubescent or glabrous; midrib of valves very prominent. Seeds 11–13 lin. long, 3½ lin. broad.—Engl. Glied. Veg. Usambara, 34; K. Schum. in Engl. Pfl. Ost-Afr. C. 364; De Wild. Études Fl. Katanga, 128. *S. dentatum,* A. Rich. Tent. Fl. Abyss. ii. 58; Bureau in Adansonia, ii. 196, t. 4, Monogr. Bignon. t. 29; Schweinf. Beitr. Fl. Aethiop. 98; Oliv. in Trans. Linn. Soc. Bot. xxix. 123; Penzig in Malpighia, viii. 466, t. 9; Engl. Hochgebirgsfl. Trop. Afr. 386; Engl. Glied. Veg. Usambara, 40; Almagià in Ann. Istit. Bot. Roma, viii. 123; K. Schum. in Engl. Pfl. Ost-Afr. C. 364. *S. integrifolium,* A. Rich. Tent. Fl. Abyss. ii. 59; Martelli, Fl. Bogos. 64; K. Schum. in Engl. Pfl. Ost-Afr. C. 364. *S. Arguezana,* A. Rich. Tent. Fl. Abyss. ii. 59; Engl. Hochgebirgsfl. Trop. Afr. 386. *S. senegalense,* Miq. Ann. Mus. Bot. Lugd. i. 200. *S. discolor,* K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 242. *S. cinereo-viride,* K. Schum. l.c. 243. *S. molle,* K. Schum. l.c. 242. *S. arnoldianum,* De Wild. Études Fl. Katanga, 128. *Bignonia discolor,* R. Br. in Salt, Abyss. App. 64. *B. lanata,* Steud. Nomencl. ed. ii. i. 205. *Dolichandrone Smithii,* Baker in Kew Bulletin, 1894, 30. *Spathodea lævis?* T. Thoms. in Speke, Nile, Append. 642. *Spathodea?* Oliv. in Trans. Linn. Soc. xxix. 124.

Upper Guinea. Senegal, *Heudelot,* 202! Gold Coast: Krepi Plains, *Johnson,* 537! Togo, *Baumann,* 372! Western Lagos, *Rowland!* Northern Nigeria: Nupe, *Barter,* 1135! Bornu, *Vogel,* 89!

Nile Land. Fazokl, *Kotschy,* 454! Kordofan: near Rahad Lake, *Muriel,* 163! near Taiara, *Muriel,* 175! Eritrea: various localities, *Schweinfurth & Riva,* 1401! 2217! *Beccari,* 29! Abyssinia: Mount Sholoda, *Schimper,* 308! Gondar, *Steudner,* 486! Ankober, *Roth!* Soudan: by the Sobat River, *Muriel,* 105! by the White Nile, *Schweinfurth,* 1013! Moru; Wayo, *Petherick!* by the Bahr-el-

Ghazal, near Chuk-Chuk, *Broun!* Near Old Wau, *Brown*, 59! Mittu; Ngama, *Schweinfurth*, 2767! between Derago and Kuddu, *Schweinfurth*, 2771! between Moro and Ngama, *Schweinfurth*, 2778! Kuraggera, *Schweinfurth*, 2787! Mvolo, *Schweinfurth*, 2845! Niamniam; Wando, *Schweinfurth*, 3229! Uganda: Madi, *Speke & Grant*, 750! Kavirondo, *Scott-Elliot*, 7014! Chagwe and Busoga, *Dawe*, 87! Toro, *Dawe*, 535! British East Africa: Shimba Hills, *Kässner*, 173!

South Central. Congo Free State: Katanga; Moero, *Verdick*. Lukafu, *Verdick*, 19! 92.

Mozamb. Dist. German East Africa: without precise locality, *Busse*, 643! Urambo, *Hannington!* Kilimanjaro, *Smith!* Usambara; Magila, *Holst*, 2229! Simbili, *Holst*, 2368! Mgunda Mkali region, *Speke & Grant!* and without precise locality, *Buchwald*, 105! Usaramo, 1000 ft., *Goetze*, 30! Portuguese East Africa: Shupanga, *Kirk! Scott!* British Central Africa: Batoka Country; near Sinamane, 2000 ft., *Kirk!* Tanganyika-Moero Plateau, *Carson*, 20! Nyasaland; various localities, *Kirk! Meller! Whyte! Whyte & McClounie*, 11! *Buchanan*, 232! *Waller!*

2. **S. acuminatissimum,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 243. Branchlets rather stout, flattened at the nodes, finely striate, glabrous, blackish in the dried state. Leaves 17–23 in. long; rhachis puberulous on the upper surface; petiole $3\frac{1}{4}$–4 in. long; leaflets 13–17, distinctly stalked, ovate-oblong or lanceolate (the lowermost ovate), long and sometimes abruptly acuminate at the apex, obtusely and unequally cuneate at the base, 3–6 in. long, $1\frac{1}{4}$–$1\frac{3}{4}$ in. broad, entire, glabrous. Panicle ample, corymbose-pyramidal; bracts foliaceous, lanceolate, ciliate, sparsely pubescent on the upper surface. Buds apiculate or acuminate. Calyx tubular, 8–9 lin. long, 2-lipped, glabrous, occasionally subspathaceous; lobes 2, ovate, acute, 1–$2\frac{1}{2}$ lin. long. Corolla-tube funnel-shaped, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long; basal cylindric portion 5–$5\frac{1}{2}$ lin. long, pilose below the insertion of the stamens; ventral portion of throat very sparsely villous; lobes 5–7 lin. long, crenulate, sparsely ciliate. Stamens inserted 6–$6\frac{1}{2}$ lin. above the base of the corolla-tube; anthers oblong-linear, 1–$1\frac{1}{2}$ lin. long. Disc annular, entire, $\frac{3}{8}$ lin. high. Ovary quadrangular, $2\frac{3}{4}$–$3\frac{1}{2}$ lin. long, glabrous.

Upper Guinea. Lagos, *Phillips*, 41! Cameroons, *Preuss*, 332!

3. **S. Zenkeri,** *K. Schum. ex De Wild. Études Fl. Katanga*, 130 (*Jan.* 1903). A tree 50–65 ft. high; bark smooth, grey; crown dense, subglobose; branches stout, much flattened at the nodes, finely striate, minutely tomentellous, the young ones dark olive-green in the dried state. Leaves 13–17 in. long; rhachis tomentellous; petiole 2–3 in. long; leaflets 11–15, distinctly stalked, ovate-oblong or oblong (the lowermost ovate), acuminate at the apex, unequally and obtusely cuneate at the base, $2\frac{3}{4}$–5 in. long, 1–2 in. broad, entire, puberulous or glabrescent above, pubescent below, especially on the veins. Panicle ample, corymbose; bracts foliaceous, lanceolate, pubescent on both surfaces. Buds obtuse. Calyx tubular, $6\frac{1}{2}$–7 lin. long, 2-lipped, pubescent or tomentose outside, glabrous inside; lobes 2–3, $1\frac{1}{4}$–2 lin. long, ovate, obtuse. Corolla-tube funnel-shaped, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long; basal cylindric portion 5–6 lin. long, pilose below the insertion of the stamens; ventral portion of throat

very sparsely villous; lobes 5–6½ lin. long, crenulate, ciliate. Stamens inserted 6–6½ lin. above the base of the corolla-tube; anthers oblong-linear, 1–1⅛ lin. long. Disc annular, entire, ⅜ lin. high. Ovary quadrangular, 2¼–2½ lin. long, glabrous.—*S. bracteosum*, K. Schum. in Engl. Jahrb. xxxiii. 332 (March, 1903).

Upper Guinea. Cameroons: Yaunde, *Zenker & Staudt*, 350! *Zenker*, 1481!

4. **S. harmsianum,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 243. A tree, 20 ft. high. Leaves 6–16 in. long; rhachis tomentose or pubescent; leaflets 7–11, elliptic-oblong, obovate, or oblong-obovate, rounded or obtuse at the apex and more or less apiculate, unequally rounded or obtuse or subcordate at the base, 1¾–4 in. long, 11–22 lin. broad, finely tomentose above and pale-brown in the dried state, tomentose and greyish-white beneath. Panicle tomentose; rhachis triangular, with 7 or fewer whorls of ternate primary branches; further branching dichasial; bracts linear-lanceolate, obtuse, tomentose, the lowermost 1 in. long. Calyx tubular, 6–10½ lin. long, irregularly 2–4-lobed, greyish-tomentose outside, adpressed-puberulous or -pubescent and lepidote inside; tube 5½–8 lin. long; lobes triangular-ovate or rounded, more or less apiculate, 1–2½ lin. long or less. Corolla yellow with red stripes, funnel-shaped, slightly curved posticously, the upper half pubescent outside; tube 16–18 lin. long; basal cylindric portion 4½–5½ lin. long; lobes suborbicular, 2–3½ lin. long. Stamens included, or the longer pair subexserted from the corolla-tube, inserted 5½–7 lin. above its base; filaments pilose at the base; anther-lobes oblong, 1–1½ lin. long; connective slightly produced above them. Disc cupular, more or less lobed, ¾–1 lin. high. Ovary quadrangular, 1¾–2¼ lin. long, glabrous or sparsely lepidote. Capsule about 1 ft. long; valves with prominent midrib, minutely pubescent. Seeds up to 3 in. long, including the wings, 4–5 lin. broad.—Henriques in Bolet. Soc. Brot. xvi. 71. *S. Verdickii*, De Wild. Études Fl. Katanga, 129. *S. katangensis*, De Wild. l.c. 130.

Lower Guinea. Angola: district of Malange; Chicapo River, *Marques*, 244!

South Central. Angola: Lunda; Kahungula, *Buchner*, 587! 629! Congo Free State: Katanga; Lukafu, *Verdick*, 194! 265!

5. **NEWBOULDIA**, Seem.; Benth. et Hook. f. Gen. Pl. ii. 1045.

Calyx opening late in bud, spathaceous, split down the anticous side, nearly straight. Corolla campanulate-funnel-shaped; limb slightly bilabiate; lobes spreading. Stamens 4, didynamous, included; anther-lobes attached at and for a short distance below the apex, oblong, slightly divergent below. Disc cupular, more or less lobed. Ovary oblong-linear, 4-angled, slightly compressed; ovules 2-seriate in each cell, obliquely placed on the placentas. Capsule linear; valves boat-shaped, coriaceous, flexible, glandular. Seeds obliquely winged at the ends.—

A tree or shrub with opposite or ternate, more rarely alternate, imparipinnate leaves, and terminal panicles of pink, purple or purple and white flowers.

Monotypic, endemic. The new species from Zanzibar, mentioned by Bentham & Hooker, l.c., is *Markhamia zanzibarica*, K. Schum.

1. **N. lævis,** *Seem. in Journ. Bot.* 1863, 225; 1870, 211, 337. A nearly glabrous shrub or tree, 10–40 ft. high. Branches stout, subterete, glabrous, pallid. Leaves opposite or ternate (more rarely alternate), long petioled, 1–2 ft. long; leaflets 7–13, subsessile, ovate-oblong, obovate or lanceolate, obtusely long-acuminate, 3–8 in. long, 1–3½ in. broad, glandular at the base on the lower surface, midrib sometimes minutely puberulous on the upper, leaflets otherwise glabrous, distinctly reticulated. Flowers in dense terminal racemes of 3–7-flowered cymes; pedicels 2–3 lin. long. Calyx oblong, green or purplish-brown, 8–12 lin. long, bilobed at the apex, dotted with a few large glands, especially in the lower half; lobes minutely toothed at the apex. Corolla campanulate-funnel-shaped, 2–2¼ in. long, pink, purple, or white with purplish spots and lines, minutely pubescent inside; tube 1½ in. long, basal cylindric portion 3½–4½ lin. long; lobes spathulate-obovate, ½–¾ in. long, gland-dotted and more or less puberulous outside. Stamens inserted 4–5 lin. above the base of the corolla-tube; filaments thickened and glandular-pilose at the base; anther-lobes about 2½ lin. long. Disc about 1 lin. high. Ovary linear, quadrangular or roughly so, about 4 lin. long, glandular; style slightly bent above its insertion. Capsule about 1 ft. long, pointed; valves 3-nerved, gland-dotted; septum 1 lin. thick, 5–6 lin. broad; seeds asymmetric, obliquely winged at each end, 1½ in. long (including the wings), ½ in. broad.—Bureau, Monogr. Bignon. t. 15; Henriques in Bolet. Soc. Brot. x. 145; De Wild. & Durand, Contrib. Fl. Congo, i. 45; Reliq. Dewevr. 172; Hiern, Cat. Afr. Pl. Welw. i. 790. *Newbouldia pentandra*, Seem. in Journ. Bot. 1870, 338. *Spathodea levis*, Beauv. Fl. Owar. i. 48, t. 29; Vent. Choix, No. 40, in note; Pers. Syn. ii. 173; DC. Prodr. ix. 208; Hook. Bot. Mag. t. 4537; Lem. Jard. Fleur. i. t. 51. *S. adenantha*, G. Don, Gen. Syst. iv. 222; DC. Prodr. ix. 207. *S. pentandra*, Hook. Bot. Mag. t. 3681. *S. Jenischii*, Sond. in Hamburger Gartenzeit. iv. 370; Bot. Zeit. 1848, 792; Walp. Ann. iii. 89. *S. speciosa*, Brongn. in Lem. Herb. Gen. Amat. 2me sér. t. 70, and in Lem. Hort. Univ. v. 357, with fig.; DC. Prodr. ix. 563; Morren in Ann. Soc. Agric. Bot. Gand, v. 213, t. 260; Planch. in Fl. Serres, 1re sér. vi. 309, t. 634 (*levis* on plate). *Bignonia glandulosa*, Schumach. & Thonn. Beskr. Guin. Pl. 274.

Upper Guinea. Senegal: Cayor, *Dollinger*, 36! and without precise locality, *Heudelot*, 818! Gambia, *Ozanne*, 4! *Brown-Lester*, 831! 846! Sierra Leone: Scarcies; Kambia, *Scott-Elliot*, 4350! and without precise locality, *Garrett*, 21! *Barter!* Liberia; near Monrovia, *Whyte!* Gold Coast: Aburi Hills, *Johnson*, 297! Togo: near Lome, *Warnecke*, 65! Dahomey, *Burton!* Lagos: Ebute Metta, *Millen*, 59! and without precise locality, *Millen*, 25! *Moloney*, xxvi.! Southern Nigeria: Cross River Division, *McLeod!* Fernando Po, *Mann*, 84! Cameroons: Yaunde, *Zenker & Staudt*, 104! 724! Fipinde, *Zenker*, 1594! and without precise locality, *Kalbreyer*, 48! *Preuss*, 515!

Lower Guinea. Island of St. Thomas, *Welwitsch*, 1259! *Gossweiler*, 134! *Moller*. Gaboon: Munda: Sibange Farm, *Soyaux*, 421!

South Central. Congo Free State: Dyema Lianga; Campi, *Cabra*; Lukungu, *Laurent*.

6. **MARKHAMIA**, Seem.; K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 242.

Calyx opening late in bud, spathaceous, split down the posticous side, boat-shaped in outline, more or less cuspidate or uncinate at the apex. Corolla funnel-shaped or campanulate-funnel-shaped; limb bilabiate; lobes spreading. Stamens 4, didynamous, included; anther-lobes attached at the apex, tapering towards the base, divergent. Disc annular or cupular. Ovary oblong; ovules 4–6-seriate in each cell. Capsule linear; valves flat or nearly so; true septum very small, bearing in its middle a much larger false septum parallel to the valves. Seeds oblong, winged at the ends.—Trees and shrubs, with opposite, simply imparipinnate leaves, and terminal or lateral panicles or racemes; corolla yellow with chocolate or red stripes, or greenish-yellow with purple spots and brownish-purple lobes, rarely lilac.

Species 12, 2 of them Asiatic.

Pseudostipules orbicular, foliaceous.
- Corolla $1\frac{1}{4}$–$1\frac{3}{4}$ in. long; lobes brownish-purple; tube purple-spotted.
  - Adult leaves pubescent on both surfaces . . 1. *M. puberula.*
  - Adult leaves not pubescent.
    - Pedicels 2–4 lin. long; inflorescence terminal or both terminal and axillary.
      - Inflorescence a rather strict raceme of 3-flowered cymes; seeds under $\frac{3}{4}$ in. long, with a nearly square nucleus . . 2. *M. stenocarpa.*
      - Inflorescence a loose panicle of 3–7-flowered cymes; seeds 1–$1\frac{2}{3}$ in. long, with an oblong nucleus . . . . . 3. *M. zanzibarica.*
    - Pedicels 4–7 lin. long; inflorescence axillary . 4. *M. acuminata.*
- Corolla $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, yellow (very rarely lilac).
  - Calyx shortly cuspidate; filaments densely furfuraceous at the base . . . . . 5. *M. platycalyx.*
  - Calyx acuminate; filaments pilose at the base.
    - Calyx herbaceous; corolla-lobes conspicuously glandular . . . . . 6. *M. lutea.*
    - Calyx membranous; corolla-lobes inconspicuously glandular . . . . . 7. *M. Hildebrandtii.*

Pseudostipules conical or subulate, not foliaceous.
- Lateral cymes sessile . . . . . 8. *M. sessilis.*
- Lateral cymes peduncled.
  - Leaflets rounded or subcordate at the base; pseudostipules subulate-acuminate from a broad base, 3–6 lin. long; capsule velvety-tomentose . . . . . 9. *M. lanata.*
  - Leaflets wedge-shaped at the base; pseudostipules conical, not acuminate, 2–$4\frac{1}{2}$ lin. long; capsule finely pubescent or puberulous . . 10. *M. tomentosa.*

1. **M. puberula,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 242. A shrub or a tree, 26–32 ft. high (*Schumann*); branchlets and leaves densely pubescent. Leaves 4–5 in. long; leaflets 5–7, elliptic-oblong or ovate, sometimes shortly acuminate, 1–2 in. long, ½–1 in. broad, obtuse or retuse, entire or serrate. Racemes axillary, borne on the old wood, 3–6 in. long, pubescent, sometimes leafy at the base. Peduncles 4–5 lin. long; pedicels 3–4 lin. long. Calyx 4½ lin. long, minutely cuspidate, split down to within 1–1½ lin. from the base, pubescent, sparsely lepidote. Corolla-tube funnel-shaped, 12½ lin. long, purple-spotted; basal cylindric portion 3 lin. long, 1 lin. in diam.; lobes brownish-purple, 4–5 lin. long. Stamens inserted 3 lin. above the base of the corolla-tube; anther-lobes 1 lin. long, acute at the base. Disc annular, ½ lin. high. Ovary 1¼ lin. long, densely lepidote.—Engl. Jahrb. xxviii. 480; Engl. Pfl. Ost-Afr. C. 363. *Spathodea puberula,* Klotzsch in Peters, Reise Mossamb. Bot. 192. *Nuenteria puberula,* Seem. in Journ. Bot. 1870, 339. *Dolichandrone hirsuta,* Baker in Kew Bulletin, 1894, 31.

Mozamb. Dist. German East Africa: Uluguru; Mgasi, *Goetze,* 136. Portuguese East Africa: Lower Zambesi; Tete, *Kirk! Peters!*

2. **M. stenocarpa,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv 3 B. 242. A tree, 15–25 ft. high; branchlets glabrous. Leaves 5½–10 in. long; leaflets 7, ovate or elliptic-oblong, rather abruptly acuminate, 1½–5 in. long, 1–2 in. broad, entire, very minutely and sparsely puberulous and lepidote. Raceme terminal; rhachis lenticellate. Peduncles 2 lin. long, pilose, soon glabrescent; pedicels 3 lin. long or less. Calyx 5½–6 lin. long, uncinate, split down to within ½–2 lin. from the base, lepidote. Corolla-tube campanulate-funnel-shaped, 11–12 lin. long, greenish-yellow with purple spots; basal cylindric portion 2½ lin. long, 1⅓ lin. in diam.; lobes brownish-purple, 4–6 lin. long, crenulate. Stamens inserted 2½–3 lin. above the base of the corolla-tube; anther-lobes ⅞ lin. long, obtuse at the base. Disc annular, ⅔ lin. high. Ovary 2⅓ lin. long, lepidote. Capsule falcate, 1–1½ ft. long, 4–5 lin. broad, lenticellate; seeds 8–9 lin. long, 2⅓–3½ lin. broad; nucleus 2½–2⅔ lin. long.—Hiern, Cat. Welw. Afr. Pl. i. 791. *Nuenteria stenocarpa,* Seem. in Journ. Bot. 1865, 329, t. 36 (excluding Kirk's specimen). *Spathodea stenocarpa,* Welw. ex Seem. l.c. *Dolichandrone stenocarpa,* Baker in Kew Bulletin, 1894, 31.

Lower Guinea. Angola: Golungo Alto; at the River Luiaha and near Cambondo, *Welwitsch,* 482! Pungo Andongo; forest of Mata de Cabondo and near Luxille, *Welwitsch,* 483!

3. **M. zanzibarica,** *K. Schum. ex Engl. Glied. Veg. Usambara,* 34, 36. A shrub or small tree, 10 ft. high; branchlets glabrous. Leaves 5–13 in. long; leaflets 7, elliptic-oblong, long acuminate, mucronulate, 1½–6 in. long, ¾–2½ in. broad, entire or serrulate, especially towards the apex, coriaceous, brownish when dry, glabrous above, minutely lepidote below. Racemes terminal and lateral, lepidote; rhachis conspicuously lenticellate. Peduncles 4 lin. long; pedicels 2–4 lin. long. Calyx 6–7 lin. long, shortly uncinate, split down to within 1–4 lin. from the

base, lepidote, sometimes puberulous. Corolla-tube funnel-shaped, 11–12 lin. long, yellowish with purple spots; basal cylindric portion 3–4½ lin. long, 1–1¼ lin. in diam.; lobes brownish-purple, 4–5 lin. long. Stamens inserted 4–5 lin. above the base of the corolla-tube; anther-lobes 1 lin. long, acute at the base. Disc annular, ⅔ lin. high. Ovary 2–2⅓ lin. long, densely lepidote. Capsule falcate, 1–1½ ft. long. 5–6 lin. broad, lenticellate; seeds 1–1⅔ in. long, 2⅓–2½ lin. broad; nucleus 5–6 lin. long.—Engl. & Prantl, Pflanzenfam. iv. 3 B. 242. *M. sansibarica*, K. Schum. ex Engl. Glied. Veg. Usambara, 16; Engl. Pfl. Ost-Afr. C. 363; Engl. Jahrb. xxxiii. 332. *Spathodea tenuifolia*, Bojer. Hort. Maurit. 219. *S. zanzibarica*, Bojer ex DC. Prodr. ix. 208; Klotzsch in Peters, Reise Mossamb. Bot. 191. *Muenteria zanzibarica*, Seem. in Journ. Bot. 1870, 339. *Dolichandrone latifolia*, Baker in Kew Bulletin, 1894, 31.

Nile Land. British East Africa: Nyika Country, near Mombasa, *Wakefield!*

Mozamb. Dist. Zanzibar: Kokotoni, *Hildebrandt*, 977! German East Africa: Usambara; Derema, *Scheffler*, 126! Masheua, *Holst*, 8795! Tanga, *Heinsen*, 113! Magila, *Kirk!* Usaramo; Dar-es-Sa aam, *Kirk!* Portuguese East Africa: Mozambique, *Forbes*, 15!

4. **M. acuminata,** *K. Schum. in Engl. Pfl. Ost-Afr. C.* 363. A shrub (*Peters*) or a tree, 10–20 ft. high (*Lugard*); branchlets minutely lepidote. Leaves 5–9 in. long; leaflets 5–7, elliptic, shortly and obtusely or, more rarely, acutely acuminate, 1–4 in. long, ¾–2½ in. broad, entire or serrulate, minutely and sparsely puberulous and lepidote above, lepidote below. Racemes axillary, borne on the old wood, lepidote, sometimes leafy at the base. Pedicels 4–7 lin. long, slender, minutely bibracteolate below the middle. Calyx 7–9 lin. long, cuspidate or uncinate, split down to within 1½–3 lin. from the base, lepidote, sometimes puberulous. Corolla-tube funnel-shaped, 14–15 lin. long, yellowish with purple spots; basal cylindric portion 2½–3 lin. long, 1⅓ lin. in diam.; lobes brownish-purple, 6–8 lin. long. Stamens inserted 3–3½ lin. above the base of the corolla-tube; anther-lobes 1 lin. long, obtuse at the base. Disc annular, nearly 1 lin. high. Ovary 1½–2 lin. long, lepidote. Capsule 1–1¼ ft. long, 5 lin. broad, lenticellate; nucleus of seed 4–4½ lin. long, 2 lin. broad.—*Spathodea acuminata*, Klotzsch in Peters, Reise Mossamb. Bot. 191. *Muenteria stenocarpa*, Seem. in Journ. Bot. 1865, 329, partly (as to Kirk's specimen).

Mozamb. Dist. Portuguese East Africa: opposite Sena, *Kirk!* between Tete and Kaurabassa, *Kirk!* Bechuanaland: Ngamiland; Kwebe Hills, *Lugard*. 55! 58! South Tropical Africa, *Baines!*

M. infundibuliformis, K. Schum. in *Engl. & Prantl, Pflanzenfam.* iv. 3 B. 242, and in *Engl. Pfl. Ost-Afr. C.* 363, from Msalala (*Hannington!*) and Ussure (*Fischer*, 460!) in German East Africa, scarcely differs from *M. acuminata* (as far as the material goes) except in having the veins of the leaflets distinctly pilose on the under surface, even in the adult state. Fischer's specimen has serrate leaflets, Hannington's entire leaflets. It is possible that the capsule and seeds, when known, may furnish further characters by which to separate *M. infundibuliformis* from *M. acuminata*.

5. **M. platycalyx,** *Sprague in Hook. Ic. Pl. t.* 2800. A tree, 30–40 ft. high; branchlets lepidote. Leaves $6\frac{1}{2}$–12 in. long; leaflets 5–9, shortly stalked, elliptic-oblong or obovate, rather shortly, abruptly and obtusely acuminate, mucronulate, cuneate at the base, 2–$5\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{3}{4}$ in. broad, entire or serrate, lepidote above, very densely lepidote below and pilose in the axils of the veins. Panicles terminal and axillary; rhachis lenticellate, densely lepidote, pilose above, especially at the nodes. Pedicels 3–5 lin. long, densely pubescent. Calyx 7–8 lin. long, shortly and obtusely cuspidate, split down to within $2\frac{1}{2}$–3 lin. from the base, densely lepidote, pubescent. Corolla yellow, striped with red on the lower lip; tube campanulate above, 16–18 lin. long; basal cylindric portion 4 lin. long, $1\frac{1}{3}$–$1\frac{1}{2}$ lin. in diam.; lobes 6–7 lin. long, conspiculously glandular. Stamens inserted $3\frac{1}{2}$–$4\frac{1}{2}$ lin. above the base of the corolla-tube; filaments much thickened and furfuraceous at the base; anther-lobes $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Disc cupular, $1\frac{1}{4}$ lin. high. Ovary $3\frac{1}{2}$ lin. long, very densely lepidote, minutely pubescent. Stigma-lobes elliptic, bifid at the apex. Capsule over 1 ft. long, $4\frac{1}{2}$–5 lin. broad, minutely puberulous and lepidote; midrib of valves very prominent; seeds 9 lin. long, $1\frac{1}{2}$ lin. broad; nucleus $3\frac{1}{2}$ lin. long.—*Dolichandrone platycalyx,* Baker in Kew Bulletin, 1894, 30.

Nile Land. Uganda: near Entebbe, 4000 ft., *Mahon!* Busiro, 3900 ft., *Dawe,* 217! Usoga, *Scott-Elliot,* 7208! Wimi Valley, 7000–8000 ft., *Scott-Elliot,* 7830! and without precise locality, *Wilson,* 119!

This tree, which is known in Uganda under the native name *Lusambia,* is said to yield "the finest of local timbers" (*Mahon*).

6. **M. lutea,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 242. A shrub or tree, 15–30 ft. high; branchlets finely lepidote, soon glabrescent. Leaves 9–20 in. long; leaflets 7–11, conspicuously stalked, ovate, ovate-oblong or lanceolate, acuminate, mucronulate, cuneate or attenuate at the base, 3–$7\frac{1}{2}$ in. long, $1\frac{1}{4}$–$2\frac{1}{2}$ in. broad, entire or occasionally serrulate in a young state, sparsely lepidote or glabrescent above, lepidote and sometimes puberulous below. Panicles terminal and axillary, corymbose, densely lepidote; rhachis blackish, densely lenticellate. Peduncles 1–$2\frac{1}{2}$ lin. long; pedicels 2–$3\frac{1}{2}$ lin. long. Calyx 10–14 lin. long, uncinate, split down to within $3\frac{1}{2}$–6 lin. from the base, herbaceous, densely lepidote. Corolla yellow, rarely lilac (*Brown*); tube campanulate above, 15–20 lin. long; basal cylindric portion 4–$5\frac{1}{2}$ lin. long, $1\frac{3}{4}$–2 lin. in diam.; lobes 7–9 lin. long, conspiculously glandular. Stamens inserted 4–$5\frac{1}{2}$ lin. above the base of the corolla-tube; filaments much thickened and pilose at the base; anther-lobes 1–$1\frac{1}{2}$ lin. long. Disc annular, $\frac{1}{2}$–$\frac{3}{4}$ lin. high. Ovary $2\frac{1}{2}$–3 lin. long, very densely lepidote; stigma-lobes elliptic or elliptic-oblong, bifid at the apex. Capsule falcate, 18–22 in. long, 5–$6\frac{1}{2}$ lin. broad, minutely and densely lepidote; seeds 1–$1\frac{1}{4}$ in. long, $2\frac{1}{2}$–$2\frac{3}{4}$ lin. broad; nucleus $4\frac{1}{2}$–5 lin. long.—De Wild. & Durand, Reliq. Dewevr. 172; Sprague in Hook. Ic. Pl. sub t. 2803. *Spathodea lutea,* Benth. in Hook. Niger Fl. 461, partly (as regards the Fernando Po plant). *Dolichandrone lutea,* Benth. et Hook. f. Gen. Pl. ii. 1046. *Muenteria lutea,* Seem. in Journ. Bot. 1870, 338, partly (as regards Vogel's and Ansell's specimens).

Upper Guinea. Gold Coast, *Brown*, 393! Fernando Po, *Mann*, 5! 399! *Vogel*, 60! *Ansell!* Cameroons: Victoria, *Kalbreyer*, 33! Yaunde, *Zenker*, 251! *Zenker & Staudt*, 66! and without precise locality, *Preuss*, 436!

7. **M. Hildebrandtii,** *Sprague in Hook. Ic. Pl. t.* 2800, *fig.* 9. A shrub or small tree; branchlets finely lepidote. Leaves 6–10 in. long; leaflets 7–9, shortly stalked, ovate or ovate-oblong, obtusely acuminate, cuneate at the base, 2–4 in. long, $\frac{3}{4}$–2 in. broad, entire, minutely lepidote. Panicle terminal or terminal and axillary; rhachis lenticellate, densely lepidote, pilose above. Pedicels 2 lin. long. Calyx 9–11$\frac{1}{2}$ lin. long, shortly uncinate, split down to within 2–4 lin. from the base, membranous, finely and densely lepidote, puberulous. Corolla yellow; tube campanulate-funnel-shaped, 16–20 lin. long; basal cylindric portion 5–5$\frac{1}{2}$ lin. long, 1$\frac{1}{4}$ lin. in diam.; lobes 7–10 lin. long, sparsely and inconspicuously glandular. Stamens inserted 5$\frac{1}{2}$–7 lin. above the base of the corolla-tube; filaments slightly thickened and pilose at the base; anther-lobes 1–1$\frac{1}{4}$ lin. long. Disc annular, $\frac{1}{2}$–$\frac{3}{4}$ lin. high. Ovary 2$\frac{1}{4}$–2$\frac{1}{2}$ lin. long, minutely and densely lepidote; stigma-lobes elliptic or ovate, entire or minutely serrulate.—*M. lutea*, K. Schum. in Engl. Pfl. Ost-Afr. C. 363, partly (as regards the East African localities), not of K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B, 242. *Dolichandrone Hildebrandtii*, Baker in Kew Bulletin, 1894, 31.

Nile Land. British East Africa: Ukamba; Kitui, *Hildebrandt*, 2732! Kikuyu; Nairobi, *Kässner*, 967!

Mozamb. Dist. German East Africa: Usambara: Derema, *Scheffler*, 142!

8. **M. sessilis,** *Sprague.* A shrub or tree, 5–30 ft. high; branchlets pubescent or puberulous. Leaves 9–21 in. long; leaflets 11–15, ovate, ovate-oblong or lanceolate, obtusely acuminate, 3–7$\frac{1}{2}$ in. long, 1–3 in. broad, entire or serrulate, glabrous above, except the veins (rarely puberulous), finely pubescent or glabrescent below; pseudostipules subulate, 4–5 lin. long, pubescent. Raceme terminal, oblong, elongated, tomentose; lateral cymes sessile. Pedicels 3–4 lin. long. Calyx 11–14 lin. long, rostrate, split down to within 3 lin. from the base, shortly tomentose; beak 2$\frac{1}{2}$–4 lin. long. Corolla yellow, with reddish stripes; tube 18–19 lin. long; basal cylindric portion 3–4 lin. long, 1$\frac{1}{2}$–1$\frac{3}{4}$ lin. in diam.; lobes conspicuously glandular. Stamens inserted 3$\frac{1}{2}$–4$\frac{1}{2}$ lin. above the base of the corolla-tube; filaments slightly thickened and furfuraceous at the base; anther-lobes 1$\frac{1}{2}$–1$\frac{3}{4}$ lin. long. Disc annular, $\frac{3}{4}$ lin. high. Ovary 4–5 lin. long, glabrous; stigma-lobes elliptic or ovate-lanceolate, entire or dentate. Capsule slightly curved, 1$\frac{1}{2}$–3 ft. long, 8–9 lin. broad, finely tomentose; seeds 13–18$\frac{1}{2}$ lin. long, 3–3$\frac{1}{2}$ lin. broad; nucleus 4$\frac{1}{2}$–5$\frac{1}{2}$ lin. long.—*Muenteria tomentosa*, Seem. in Journ. Bot. 1865, 330, t. 35, partly (as regards figure and Angola plant, excl. synonyms). *Markhamia tomentosa*, Hiern, Cat. Afr. Pl. Welw. i. 792, not of K. Schum.

Lower Guinea. Lower Congo, *Smith!* Angola: Golungo Alto; near Sange, at the base of the Serra de Alto Queta, *Welwitsch*, 485! among the mountains of Cungulungulo, *Welwitsch*, 485b! and fruit, 815!

Var. *brachyrhyncha*, Sprague. Whole plant more glabrous. Leaflets under 4 in. long, finely reticulate above; lateral veins regular, conspicuous on the lower surface; pseudostipules puberulous. Raceme under 4 in. long. Calyx $7\frac{1}{2}$–$8\frac{1}{2}$ lin. long; beak $1\frac{1}{2}$–$1\frac{3}{4}$ lin. long, much swollen and glandular at the base. Corolla-tube 15 lin. long; basal cylindric portion $2\frac{1}{2}$–3 lin. long; lobes 8–9 lin. long. Stamens inserted $2\frac{1}{2}$–3 lin. above the base.

Lower Guinea. French Congo: Loango; jungle near Zala, in the Chinchocho district, *Soyaux*, 208!

The specimen of *Welwitsch*, 485, in the Kew Herbarium is typical *M. sessilis*, as is that of *Welwitsch*, 485b, in the British Museum; but *Welwitsch*, 485, in the British Museum has isolated peduncled cymes, which seem to have been borne laterally on a common rhachis, approaching in this respect *M. tomentosa*, K. Schum.

9. **M. lanata,** *K. Schum. in Engl. & Prantl, Pflanzenfam.* iv. 3 B. 242. A shrub, 5–15 ft. high (*Kirk*) or a tree, 20–30 ft. high (*Purres*); branchlets tomentose, soon glabrescent. Leaves 6–17 in. long; leaflets 5–11, ovate-oblong, elliptic or obovate, shortly acuminate or rounded at the apex, rounded or subcordate at the base, $2\frac{1}{2}$–$6\frac{3}{4}$ in. long, $1\frac{1}{4}$–$3\frac{1}{4}$ in. broad, entire or more rarely serrulate, pubescent or puberulous above, tomentose below; pseudostipules subulate, acuminate, 3–6 lin. long, tomentose. Raceme terminal, oblong, elongated, tomentose; lateral cymes many-flowered, Peduncles 3–9 lin. long; pedicels 6–9 lin. long. Calyx 9–15 lin. long, obtusely uncinate or cuspidate, split down to within 2–4 lin. from the base, densely tomentose. Corolla yellow, striped with chocolate; tube 11–17 lin. long, abruptly and broadly campanulate above; basal cylindric portion 2–4 lin. long, 2–3 lin. in diam.; lobes 5–15 lin. long, conspicuously glandular. Stamens inserted 3–$3\frac{1}{2}$ lin. above the base of the corolla-tube; filaments thickened and pilose at the base; anther-lobes $1\frac{1}{4}$–$1\frac{3}{4}$ lin. long. Disc cupular, $\frac{7}{8}$–$1\frac{1}{4}$ lin. high, $\frac{1}{2}$–$\frac{3}{4}$ lin. thick, not touching the ovary. Ovary 3–$4\frac{1}{2}$ lin. long, glabrous or minutely lepidote; stigma-lobes elliptic, obtuse, entire or serrulate. Capsule falcate or nearly straight, $1\frac{1}{4}$–2 ft. long, 9–12 lin. broad, velvety-tomentose; seeds $1\frac{3}{8}$–$1\frac{5}{8}$ in. long, $3\frac{1}{2}$–4 lin. broad; nucleus $4\frac{1}{2}$–$5\frac{1}{2}$ lin. long.—Sprague in Hook. Ic. Pl. t. 2800, fig. 8. *M. tomentosa*, K. Schum. in Engl. Glied. Veg. Usambara, 34, 49, partly (as to description and localities, excl. synonyms); Engl. Jahrb. xxviii. 480. *M. paucifoliolata*, De Wild. Études Fl. Katanga, 131. *M. Verdickii*, De Wild. l. c. 132. *Dolichandrone obtusifolia*, Baker in Kew Bulletin, 1894, 31.

Mozamb. Dist. German East Africa: Kagehi, *Fischer*, 461! Usambara, *Buchwald*, 697! Magila, *Holst*, 2228! Usaramo; Bagamoya, *Kirk!* and without precise locality, *Busse*, 50! Portuguese East Africa: Lower Shire; at the foot of Morambala, *Kirk!* Lower Zambesi; Shupanga, *Kirk!* British Central Africa: Tanganyika; Niumkolo, *Carson*, 12! Lake Nyasa; Likoma Islands, *Johnson*, 40! 68 partly! Nyasaland, *Buchanan*, 781! Zomba, 2900 ft., *Purres*, 65! Mlanji, *Scott-Elliot*, 8688! Shire Highlands, *Buchanan*, 18!

South Central. Congo Free State: Lukafu, *Verdick*, 54! Lofoi, *Verdick!*

Yields an excellent timber according to Verdick.

10. **M. tomentosa,** *K. Schum. ex Engl. Glied. Veg. Usambara*, 34, 49, *partly* (*as to the synonymy, excl. description and localities*). A tree, 30 ft. high; branchlets tomentose or pubescent. Leaves 9–17 in. long; leaflets 9–13, ovate or ovate-oblong, acuminate, wedge-shaped at the base, 3–6½ in. long, 1¼–3 in. broad, entire or finely serrulate, thinly coriaceous or almost membranous, puberulous or glabrescent above (pubescent when young), tomentose or pubescent, rarely glabrescent, below; pseudostipules conical, 2–4½ lin. long, tomentose. Raceme terminal, oblong, elongated, tomentose; lateral cymes 3– to many-flowered. Peduncles 4–9 lin. long; pedicels 3–8 lin. long. Calyx 11–12½ lin. long, uncinate, split down to within 1½–2½ lin. from the base, tomentose. Corolla pale yellow; tube 15–18 lin. long, campanulate above; basal cylindric portion 3–4 lin. long, 1½–2 lin. in diam.; lobes 8–13 lin. long, conspicuously glandular. Stamens inserted 4–4½ lin. above the base of the corolla-tube; filaments thickened and pilose at the base; anther-lobes 1½–2 lin. long. Disc annular, ⅞–1¼ lin. high, ¼–⅜ lin. thick, contiguous with the ovary. Ovary 4–4½ lin. long, glabrous, or minutely lepidote at the base; stigma-lobes elliptic-ovate, obtuse or retuse. Capsule falcate, 2–2½ ft. long, 7–9½ lin. broad, finely pubescent or puberulous; seeds 1¼–1¾ in. long, 3–4 lin. broad; nucleus 5–7 lin. long.—Engl. & Prantl, Pflanzenfam. iv. 3 B. 242, partly. *Spathodea tomentosa*, Benth. in Hook. Niger Fl. 462. *Dolichandrone tomentosa*, Benth. et Hook. f. Gen. Pl. ii. 1046. *Muenteria tomentosa*, Seem. in Journ. Bot. 1865, 330, partly (as regards the synonymy, excl. description, figure and Angolan locality). *M. lutea*, Seem. l.c. 1870, 338, partly (as regards *Barter*, 555).

Upper Guinea. Senegambia, *Heudelot*, 877! Sierra Leone: Talla Hills; near Ninia, *Scott-Elliot*, 4992! Sulimania, *Scott-Elliot*, 5281! Lagos, *Phillips*, 58! Northern Nigeria: Mount Patteh, *Barter*, 555! *Vogel*, 176! Cameroons: Yaunde, *Zenker*, 1432! "Niger Expedition, probably Fernando Po," *Vogel!*

Var. *gracilis*, Sprague. Leaves membranous, finely serrulate, glabrescent below except the veins. Racemes short, slender; flowers somewhat smaller; calyx shortly cuspidate.—*Muenteria lutea*, Seem. in Journ. Bot. 1870, 338, partly (as regards Barter's Nupe plant).

Upper Guinea. Northern Nigeria: Nupe, *Barter*, 1310!

7. SPATHODEA, Beauv.; Benth. et Hook. f. Gen. Pl. ii. 1045.

Calyx opening late in bud, spathaceous, split down the posticous side, recurved, boat-shaped in outline, more or less acuminate. Corolla broadly campanulate above, abruptly narrowed to a cylindric basal portion; limb slightly bilabiate; lobes ascending. Stamens 4, didynamous, scarcely exserted; anther-lobes attached at the apex, linear, divaricate. Disc annular, truncate-conical in outline, more or less 5-lobed at the top. Ovary oblong; ovules multiseriate in each cell. Capsule oblong-lanceolate, narrowed at both ends; valves boat-shaped, rather woody.—Trees with opposite or ternate imparipinnate leaves and terminal corymbose racemes of scarlet or crimson flowers.

Species 2, both endemic.

Ovary papillose . . . . . 1. *S. campanula.*
Ovary densely pilose . . . . . 2. *S. nilotica.*

1. **S. campanulata,** *Beauv. Fl. Owar.* i. 47, *t.* 27. A tree, 20–70 ft. high. Branches subterete, striolate, glabrescent. Leaves opposite, 6–18 in. long; rhachis minutely (rarely conspicuously) pubescent; leaflets 9–19, shortly stalked or subsessile, ovate or ovate-oblong, acutely acuminate, 2–5 in. long, 1–2 in. broad, entire, thinly coriaceous, the veins usually minutely pubescent on both surfaces, otherwise glabrous or glabrescent (rarely puberulous above, densely pubescent below), lower surface glandular at or near the base; veins not at all or scarcely impressed on the upper surface. Flowers in short dense terminal corymbose racemes; rhachis and pedicels finely tomentose, the lower ones 1–2 in. long. Calyx navicular, recurved, usually long-beaked, $1\frac{1}{2}$–3 in. long, conspicuously ribbed, finely tomentose with very short subadpressed hairs. Corolla scarlet or crimson, orange at the margin, 3–$4\frac{1}{2}$ in. long, tube 2–$2\frac{1}{2}$ in. long; basal cylindric portion about $\frac{1}{2}$ in. long; lobes ovate, crispate, 1–$1\frac{1}{2}$ in. long. Anther-lobes 4–5 lin. long. Disc 1–2 lin. high, more or less lobed. Ovary 3 lin. long, minutely papillose. Capsule lanceolate-oblong, 8 in. long; valves keeled, attenuate at both ends, dark brown, glabrous; septum $1\frac{1}{2}$ in. broad. Seeds 1 in. long or more, 8 lin. broad, including the hyaline wing.—Pers. Syn. ii. 173; Vent. Choix, No. 40, in note; DC. Prodr. ix. 208; Benth. in Hook. Niger Flora, 461; Lindl. in Paxt. Fl. Gard. iii. 153, t. 104; Planch. in Fl. Serres, 1re sér. viii. t. 830; Lem. Jard. Fleur. iv. tt. 388–389; Hook. Bot. Mag. t. 5091; Seem. in Journ. Bot. 1865, 332, t. 40; Treub in Ann. Jard. Buitenz. viii. 38, t. 13; Hochreut. in Ann. Conserv. et Jard. Bot. Genève, 1898, 96; Durand & Schinz, Études Fl. Congo, i. 215; De Wild. & Durand, Contrib. Fl. Congo, i. i. 45; l.c. i. ii. 46; Reliq. Dewèvr. 172; Henriques in Bolet. Soc. Brot. xvi. 72; Hiern in Cat. Afr. Pl. Welw. i. 791. *S. tulipifera,* G. Don, Gen. Syst. iv. 223; DC. Prodr. ix. 207. *S. danckelmaniana,* Büttn. in Verh. Bot. Ver. Brandenb. xxxi. 87. *Bignonia tulipifera,* Schumach. & Thonn. Beskr. Guin. Pl. 273.

Upper Guinea. Sierra Leone: North-east from Sierra Leone, *Garrett,* 3! Scarcies, *Scott-Elliot,* 4502! Togo: near Lome, *Warnecke,* 447! Lagos: Abeokuta, *Irving!* Yoruba, *Moloney!* Southern Nigeria: Niger Delta, *Barter,* 560! Confluence of the Niger at Stirling, *Ansell!* New Calabar, *Holland,* 151! Cross River Division, *Johnston!* Fernando Po, *Mann,* 387! Cameroons: Ambas Bay, *Mann;* Yaunde, *Zenker & Staudt,* 669! Bipinde, *Zenker,* 1090! and without precise locality, *Braun!*

Lower Guinea. French Congo: between the Gaboon River and Sibange, *Büttner,* 376; Sibange, *Soyaux,* 31! Loango: Chinchocho, *Soyaux,* 88! Mayombe, *Cabra.* Lower Congo, *Smith! Dupuis.* Angola: Loanda; Dembo, *Gilet;* valley of the Luachim River, *Marques,* 304; Quiballa, *Monteiro!* Libongo, *Welwitsch,* fruit, 814. Cazengo, *Gossweiler,* 581! forest at the banks of the Luinha River, near Aguas Doces, *Welwitsch,* 487. Golungo Alto; near Sange, N-della, Cambondo, Trombeta, and around Bango, *Welwitsch,* 486! by the Menha Lula road, *Welwitsch,* fruit, 813.

South Central. Congo Free State: Katanga, *Briart;* Lukolela, *Dewèrre,* 842; Mukolue River, a tributary of Lubudi River, *Descamps;* Lualaba, *Laurent;* Upoto, *Wilwerth;* Kasai; Sankuru, *Laurent;* Cataracts District, *Laurent.*

2. **S. nilotica,** *Seem. in Journ. Bot.* 1865, 333. A bushy tree,

15–20 ft. high, trunk 4 ft. in circumference. Branchlets subterete, striolate, pubescent. Leaves opposite or ternate, 5–16 in. long; rhachis densely pubescent; leaflets 9–15, subsessile, ovate-oblong, shortly and acutely acuminate, 1½–4 in. long, entire, coriaceous, glabrous above except on the puberulous impressed veins, densely pubescent or tomentose below and glandular at the base. Flowers in short dense terminal corymbose racemes; rhachis and pedicels tomentose, the lower 1–1½ in. long. Calyx navicular, recurved, 1½–2 in. long, densely tomentose with spreading or subadpressed hairs. Corolla of *S. campanulata*. Anther-lobes 3½–4 lin. long. Disc about 1½ lin. high, lobed. Ovary 3 lin. long, densely pilose.—K. Schum. in Engl. Pfl. Ost-Afr. C. 363; De Wild. & Durand, Contrib. Fl. Congo, i. i. 45; Pl. Thonner. Congol. 36; Johnston, The Uganda Protectorate, i. 68 with coloured fig. *S. campanulata*, S. Moore in Journ. Linn. Soc. Bot. xxxvii. 193, not of Beauv. *Spathodea sp.* (near *S. campanulata*), T. Thoms. in Speke, Nile, Append. 642; Oliv. in Trans. Linn. Soc. xxix. 124.

Nile Land. Niamniam: by the Mansilli Brook, *Schweinfurth*, 3899! Uganda: Buvuma Island, *Bagshawe*, 625! Unyoro, *Speke & Grant*, 571! Kavirondo and Usoga, *Whyte!*

South Central. Congo Free State: Monbuttu; at the northern boundary, *Schweinfurth*, 3563! Upoto, *Wilwerth;* Bokapo, near Ngali, 1450–1500 ft., *Thonner*, 60.

Mozamb. Dist. German East Africa, *Hannington!*

8. **RHIGOZUM,** Burch.; Benth. et Hook. f. Gen. Pl. ii. 1048.

Calyx opening early in bud, more or less regular, campanulate or tubular-campanulate, 5-toothed. Corolla funnel-shaped or campanulate-funnel-shaped; limb subbilabiate; lobes 5, subequal, spreading. Stamens 5, all perfect; anther-lobes connate above, free and parallel below. Disc saucer-shaped, lobed or entire. Ovary contracted at the base; ovules 2-seriate in each cell. Capsule oblong or elliptic-oblong, acuminate, much compressed parallel to the septum; valves smooth.—Erect, much-branched, spiny shrubs; leaves solitary or fascicled on axillary or terminal cushions, simple, trifoliolate or pinnate; flowers yellow, salmon-coloured or white, solitary or fascicled on the leaf-cushions.

Species 5, three of the following and one other occurring in South Africa.

Leaves simple, undulate; branches ternate . . .	1. *R. trichotomum.*
Leaves simple or trifoliolate, not undulate; branches not ternate.	
Leaves simple or both simple and trifoliolate; blade oblong- or linear-oblanceolate	2. *R. brevispinosum.*
Leaves all trifoliolate; blade suborbicular or obcordate	3. *R. somalense.*
Leaves pinnate	4. *R. zambesiacum.*

1. **R. trichotomum,** *Burch. Trav.* i. 299. An erect shrub, 3–4 ft. high. Branches ternate; branchlets straight, obliquely erect. Leaves simple, subsessile, alternate or ternate on the youngest shoots, on the mature branches 3–5 fascicled on small cushions, sessile on the branches,

oblong-spathulate, spathulate or obovate-spathulate, more rarely obcordate, 3½–8 lin. long, 1½–3⅓ lin. broad, undulate, glabrous, or more rarely stellately pubescent. Flowers several, fascicled on terminal, or more rarely lateral, cushions. Calyx tubular-campanulate or campanulate, 2–4 lin. long, irregularly 3–4-lobed, more or less 5-cuspidate, often prominently ribbed, pilose or subglabrous. Corolla salmon-coloured; tube funnel-shaped, ½–¾ in. long, cylindric portion equalling or exceeding the calyx, glabrous outside, slightly pilose within below the insertion of the stamens; lobes 3–6 lin. long, crenulate. Stamens inserted 2½–4 lin. above the base of the corolla-tube; filaments 4–5 lin. long; anthers 2–4 lin. long, more or less beaked or apiculate. Ovary 1–1½ lin. long. Capsule oblong, shortly beaked, 3¾ in. long, 5 lin. broad.—Drège in Linnæa, xx. 195; DC. Prodr. ix. 234; O. Kuntze in Jahrb. Bot. Gart. Berlin, iv. 270; Engl. in Engl. Jahrb. x. 254, excl. reference to Fenzl; Sprague in Dyer, Fl. Cap. iv. ii. 451, and in Hook. Ic. Pl. t. 2799; not of other authors.

Lower Guinea. German South-west Africa: Hereroland; Otyimbingue, *Fischer*, 98! and without precise locality, *Pechuel-Loesche*.

Also in South Africa. *Marloth*, 782, which I quoted under *R. obovatum*, Burch., in Fl. Cap. iv. ii. 452, on the strength of Engler's reference to Fenzl's figure (*Denkschr. Bot. Gesellsch. Regensburg*, iii. t. 5), has since been lent to Kew, and proves to be *R. trichotomum*, Burch.

2. **R. brevispinosum,** *O. Kuntze in Jahrb. Bot. Gart. Berlin*, iv. 270. An erect, slightly branched, spiny shrub, 4–10 ft. high. Branches virgate, quadrangular, tomentose or pubescent in a young state, finally becoming glabrous; spines developed into leafy branches. Leaves usually all simple (occasionally both simple and trifoliolate), alternate on the young shoots, on older shoots fascicled 3–10 together on tomentose cushions, sessile or subsessile (the trifoliolate leaves with petiole 1–1½ lin. long), oblong-oblanceolate or linear-oblanceolate, rounded, retuse or emarginate at the apex, tapered towards the base, 4–18 lin. long, 1–4½ lin. broad, more or less densely tomentose in a young state, mature leaves tomentose or puberulous, rarely glabrous. Flowers solitary or fascicled on the leaf-cushions. Calyx campanulate, 2½–4 lin. long, more or less irregularly 5-lobed, tomentose outside, sometimes glandular in the upper part; tube 1½–3 lin. long; lobes ½–1 lin. long, rounded, mucronate or not. Corolla yellow or white; tube campanulate-funnel-shaped, 5½–9 lin. long, minutely glandular-pilose at the throat and below the insertion of the stamens; basal cylindric portion 1½–3 lin. long; lobes suborbicular, retuse or emarginate, 5–9 lin. in diam., ciliate. Stamens exserted from the corolla-tube, inserted 2–6 lin. above its base; filaments 1½–4½ lin. long; anthers 1½–2½ lin. long or less, not apiculate. Ovary 1–1½ lin. long. Capsule oblong or elliptic-oblong, 2–3 in. long, 6 lin. broad, beak about 3 lin. long. Nucleus of seed elliptic; hyaline wing 1½–2½ lin. broad.—*R. brevispinum*, K. Schum. in Baum, Kunene-Samb. Exped. 370. *R. linifolium*, S. Moore in Journ. Bot. 1899, 172. *R. spinosum*, Burch. ex Sprague in Dyer, Fl. Cap. iv. ii. 451.

Lower Guinea. Angola: between Otyenyau and Chihinde, 4100 ft,, *Baum*, 40! German South-west Africa: Damaraland, *Een!* Hereroland: Otyimbingue, 3300 ft., *Pechuel-Loesche!*

Mozamb. Dist. Bechuanaland: Ngamiland; Kwebe Hills, *Lugard*, 35! *Mrs. Lugard*, 46! near Serowe, *Schönland*, 1619! 1627! flats between the Zuga and the Tamalakane Rivers, *McCabe*, 3! Matabeleland: Shasha River, *Baines!*

Also in South Africa.

Three forms of this species may be distinguished: 1. *brevispinosum* proper, which has simple leaves, tomentose even in the adult state; 2. *linifolium*, which has simple leaves, puberulous in the adult state; and 3. *spinosum*, which has both trifoliolate and simple leaves, glabrous in the adult state.

3. **R. somalense,** *Hallier f. in Engl. Jahrb.* xxxii. 127. An erect, nearly glabrous, thorny shrub, 3–10 ft. high. Branchlets virgate, terete, 1–1½ lin. thick, glabrous, greyish. Leaves solitary or 2–4 fascicled on minutely tomentose cushions, trifoliolate; petiole slender, 1–2 lin. long, slightly channelled; leaflets orbicular-obcordate, about 2 lin. long, 1½ lin. broad, minutely glandular, the terminal one attenuate into its petiole, the lateral ones oblique, subsessile. Flowers solitary on the leaf-cushions. Pedicels 2–2½ lin. long. Calyx campanulate, 1–1½ lin. long, irregularly 2–3-lobed, subbilabiate, minutely and rather acutely 5-toothed, teeth pilose at the apex, calyx otherwise glabrous. Corolla yellow; tube funnel-shaped, 3½–4 lin. long, pilose at the throat; basal cylindric portion 1½–1¾ lin. long; lobes suborbicular, retuse, 2½–3 lin. in diam., ciliate. Stamens distinctly exserted from the corolla-tube, inserted 2½ lin. above its base; filaments about 2 lin. long; anthers 1½ lin. long, not apiculate. Ovary ¾ lin. long. Capsule not known.

Nile Land. Somaliland: on mountains at Dadab, *Ellenbeck*, 165!

Allied to the South African *R. oboratum*, Burch., from which it differs in the size of the flowers and shape of the leaflets.

4. **R. zambesiacum,** *Baker in Kew Bulletin*, 1894, 32. An erect spiny shrub. Branchlets spreading. Leaves pinnate, 4–6 lin. long, solitary or fascicled on small, nearly glabrous cushions; common petiole ½–1 lin. long, slender; rhachis winged; leaflets 5–9, very shortly stalked, elliptic or obovate, 1¼–3 lin. long, ¾–1½ lin. broad, puberulous or subglabrous. Flowers fascicled on the leaf-cushions. Pedicels 1–2 lin. long. Calyx campanulate, subglabrous; tube 1½–2 lin. long; lobes ½ lin. long, roughly triangular, pilose at the apex. Corolla yellow, glabrous; tube campanulate-funnel-shaped, 5–6 lin. long; lower cylindric portion 2–2½ lin. long, exceeding the calyx; limb ¾ in. across; lobes orbicular, 3½ lin. in diam., crenulate. Stamens inserted 3½–4½ lin. above the base of the corolla-tube; filaments 2 lin. long; anthers exserted, 2–3 lin. long, slightly apiculate. Ovary ¾–1 lin. long. Capsule elliptic-oblong, 1¾ in. long, 5½ lin. broad, beak 1½ lin. long. Nucleus of seed elliptic; hyaline wing 1–1½ lin. broad.—K. Schum. in Engl. Pfl. Ost-Afr. C. 363; Sprague in Dyer, Fl. Cap. iv. ii. 452.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Tete, *Kirk!*

Also in South Africa.

9. **CATOPHRACTES**, D. Don ; Benth. et Hook. f. Gen. Pl. ii. 1048.

Calyx opening late in bud, tubular, shortly split down one side, terminated by 5 linear teeth. Corolla funnel-shaped with a long cylindric tube ; limb subbilabiate ; lobes 5 (more rarely 6–7), spreading. Stamens as many as the corolla-lobes, all perfect, subincluded ; anther-lobes connate above, free and parallel below. Disc cupular. Ovary contracted at the base ; ovules few, 2-seriate in each cell. Capsule elliptic or elliptic-oblong, slightly compressed parallel to the septum ; valves boat-shaped, woody, sharply warted.

Species 1, which extends into South Africa.

1. **C. Alexandri,** *D. Don in Ann. & Mag. Nat. Hist.* ii. (1839), 375. An erect spiny shrub, 4–6 ft. high, branched from the base. Branches divaricate, glabrous. Leaves simple, fascicled, densely tomentose ; petiole 1–2½ lin. long ; blade obovate or oblong, ⅓–1¼ in. long, 2–8 lin. broad, crenate, with conspicuous lateral veins. Flowers lateral, fascicled. Calyx densely tomentose outside ; tube 1–1½ in. long, shortly split down one side, ribbed ; teeth 3–4 lin. long. Corolla white ; tube 2–2½ in. long, with a broad villous band inside below the origin of the filaments ; limb 1¾–2½ in. across ; lobes suborbicular, 9–14 lin. in diam. Filaments either adnate for their whole length or the upper ½ in. free ; anthers 2½–3 lin. long, their tips exserted from the corolla-tube. Ovary ovoid, 1½ lin. long, scabrous with scurfy thick-based hairs ; style slightly longer than the stamens in the flowers with adnate filaments, slightly shorter in those with free filaments, very sparsely villous below the middle. Capsule 1½–3 in. long, 9–14 lin. broad, shortly beaked. Nucleus of seed suborbicular ; hyaline wing 2–3 lin. broad.—Proc. Linn. Soc. i. 4 ; Trans. Linn. Soc. xviii. 307, t. 22 ; DC. Prodr. ix. 233 ; O. Kuntze in Jahrb. Bot. Gart. Berlin, iv. 270 ; Engl. in Engl. Jahrb. x. 255 ; K. Schum. in Engl. & Prantl, Pflanzenfam. iv. 3 B. 233 ; Sprague in Dyer, Fl. Cap. iv. ii. 453. *C. Welwitschi*, Seem. in Journ. Bot. 1865, 331, t. 39 ; Hiern in Cat. Afr. Pl. Welw. i. 793. *C. kolbeana*, Harv. Gen. S. Afr. Pl. ed. ii. 276.

Lower Guinea. Angola : Bumbo ; between Pomangala and Quitibe, 1000–1200 ft., *Welwitsch*, 490 ! and fruit, 819 ; near Pomangala, *Welwitsch*, fruit, 818. German South-west Africa : Damaraland, *Kolbe !* Hereroland ; Usakos, 2950 ft., *Marloth*, 1271 ; and without precise locality, *Pechuel-Loesche*.

Mozamb. Dist. Bechuanaland : Ngamiland ; Kwebe Hills, *Lugard*, 65 ! *Mrs. Lugard*, 83 ! near Lake Ngami, *Chapman ! Baines ! Chapman & Baines !*

Also in South Africa.

10. **KIGELIA**, DC. ; Benth. et Hook. f. Gen. Pl. ii. 1053.

Calyx opening late in bud, campanulate, coriaceous, irregularly 2–5-lobed. Corolla broadly campanulate above, narrowed below to a straight, cylindric or constricted tube ; limb bilabiate ; upper lip sub-

erect, shortly 2-lobed, lower deflexed, deeply 3-lobed. Stamens 4, didynamous, subexserted; anther-lobes free for the greater part of their length, slightly divergent. Disc large, annular. Ovary 1-celled, with 2 parietal, much intruded placentas; ovules numerous, multiseriate. Fruit roughly cylindric, indehiscent; pericarp thick, enclosing a fibrous pulp in which the seeds are imbedded. Seeds thick, wingless, with a coriaceous much-intruded testa; cotyledons folded.—Trees with simply imparipinnate leaves and pendulous, long-peduncled, lax panicles of large orange or red flowers.

Species 10, 9 endemic, one extending into South Africa.

- Leaflets lanceolate . . . . . 1. *K. lanceolata.*
- Leaflets oblong, elliptic or obovate.
  - Lower portion of corolla-tube constricted.
    - Anthers 4–4½ lin. long . . . . . 2. *K. elliptica.*
    - Anthers 2½–3 lin. long.
      - Leaflets 7–13; lateral veins 8–9 on each side, rather irregular, 4–14 lin. apart.
        - Corolla brownish-red; stigma-lobes elliptic . 3. *K. acutifolia.*
        - Corolla yellow-ochre; stigma-lobes ovate-lanceolate . . . . . 4. *K. impressa.*
      - Leaflets 9–23; lateral veins 10–12 on each side, regular, 4–8 lin. apart . . . . . 5. *K. angolensis.*
  - Lower portion of corolla-tube cylindric.
    - Leaves opposite.
      - Cylindric portion of corolla-tube 10–13 lin. long; stigma-lobes dentate or serrulate.
        - Leaflets glabrous; stigma-lobes obovate . 6. *K. Elliotii.*
        - Midrib of leaflets pilose above; stigma-lobes ovate, acuminate . . . . . 7. *K. Moosa.*
      - Cylindric portion of corolla-tube 7 lin. long; stigma-lobes entire . . . . . 8. *K. africana.*
    - Leaves ternate.
      - Cylindric portion of corolla-tube shorter than the calyx . . . . . 9. *K. pinnata.*
      - Cylindric portion of corolla-tube much longer than the calyx . . . . . 10. *K. æthiopica.*

1. **K. lanceolata,** *Sprague.* Young branches purplish-brown. Leaves opposite; rhachis blackish; leaflets 11–15, lanceolate, acute, 4–7 in. long, 1¼–2 in. broad, entire, coriaceous, glabrous, finely reticulate on both surfaces; midrib and lateral veins prominent below; petioles of lateral leaflets 2–4 lin. long. Buds pointed, cuspidate at their apex. Calyx 13–17 lin. long, distinctly two-lipped, glandular above; tube 9–11 lin. long; lobes irregular, unequal, 3–5 lin. long. Corolla-tube 2–2¼ in. long, very slightly constricted 6 lin. above the base; lobes orbicular. Stamens inserted 7–8½ lin. above the base of the corolla-tube; anthers 3–3½ lin. long. Disc not lobed. Ovary 3½ lin. long, glabrous; stigma-lobes ovate, acute.

Nile Land. Uganda: Ruwenzori, *Scott-Elliot*, 7905!

2. **K. elliptica,** *Sprague.* A tree, 20–30 ft. high. Leaves opposite; leaflets 9, elliptic, acute or acutely acuminate, 4½–7 in. long, 2–3¼ in.

broad, entire or serrate towards the apex, glabrous, finely reticulate on both surfaces, membranous; lateral veins 7–9 on each side, 6–15 lin. apart; petioles of lateral leaflets 2–3 lin. long. Buds minutely cuspidate 1 lin. below their apex. Calyx 13 lin. long, distinctly two-lipped, the shorter anterior lip densely glandular; tube 7 lin. long; lobes very unequal, 2–6 lin. long. Corolla-tube 2 in. long, constricted 7–8 lin. above the base; lobes orbicular, 1 in. in diam. Stamens inserted 10 lin. above the base of the corolla-tube; anthers 4–4½ lin. long. Disc not lobed. Ovary 4½ lin. long, lepidote; stigma-lobes ovate, acute. Fruit 1½ ft. long, 1 ft. in circumference (according to *McLeod*).

Upper Guinea. Southern Nigeria: Bonny, *Monteiro!* Cross River Division, *McLeod!*

3. **K. acutifolia,** *Engl. MSS.* A tree, 20–26 ft. high. Leaves opposite; leaflets 9–11, elliptic-oblong or elliptic, acutely acuminate, cuneate or attenuate at the base, 4½–7 in. long, 2–3 in. broad, entire, or serrate towards the apex, glabrous, indistinctly reticulate; lateral veins 8–9 on each side, 7–13 lin. apart, prominent on the lower surface; petioles of lateral leaflets 1½–3 lin. long, of the terminal 9–19 lin. long. Calyx 13–16 lin. long; lobes 3, subequal, rounded. Corolla brownish-red; tube 2 in. long, constricted 6–7 lin. above the base; lobes 1–1¼ in. long. Stamens inserted 6–7½ lin. above the base of the corolla-tube; anthers 2½–3 lin. long. Ovary lepidote; stigma-lobes elliptic. Fruit 1½ ft. long.

Upper Guinea. Cameroons: Barombi, *Preuss*, 202! 360! Bipinde, *Zenker*, 1316!

4. **K. impressa,** *Sprague.* A tree, 20–25 ft. high. Young branches purplish-brown. Leaves opposite; leaflets 7–13, elliptic-oblong, 4–7 in. long, 2½–3 in. broad, entire, glabrous, those on young shoots obtuse, membranous, finely reticulate, those on old shoots shortly and abruptly acuminate, with the midrib and lateral veins deeply impressed in the shining upper surface and prominent below; lateral veins 8–9 on each side, 4–14 lin. apart; petioles of lateral leaflets 2–3 lin. long. Buds rounded, cuspidate at their apex. Calyx 11–12 lin. long, glandular above; tube 7–8 lin. long; lobes irregular, unequal, 2–4 lin. long. Corolla yellow-ochre; tube 2 in. long, constricted 5 lin. above the base; lobes 1–1¼ in. long. Stamens inserted 6–9 lin. above the base of the corolla-tube; anthers 2½–3 lin. long. Disc not lobed. Ovary 3 lin. long, lepidote. Stigma-lobes ovate-lanceolate. Fruit cylindric, abruptly acuminate, 1 ft. long, 2 in. in diam.

Upper Guinea. Fernando Po, *Barter! Mann*, 2!

5. **K. angolensis,** *Welw. MSS.* A tree, 10–35 ft. high. Leaves opposite; leaflets 19–23, elliptic-oblong or oblong, shortly and abruptly acuminate at the apex, obtusely cuneate at the base, 3½–7 in. long, 1½–3 in. broad, entire or serrate towards the apex, glabrous; lateral veins 11–12 on each side, 4–8 lin. apart; petioles of lateral leaflets 1–2 lin. long. Buds minutely cuspidate near their apex. Calyx 11–14 lin. long, two-

lipped, sparsely glandular; tube 7–10 lin. long; lobes irregular, unequal, rounded, 2–5 lin. long. Corolla orange-scarlet or scarlet; tube 2 in. long, constricted 6–6½ lin. above the base; lobes 1¼ in. long. Stamens inserted 7–7½ lin. above the base of the corolla-tube; anthers 2½–3 lin. long. Disc not lobed. Ovary 3½ lin. long, finely lepidote; stigma-lobes ovate-lanceolate. Fruit conical-cylindric, slightly compressed, 1–1½ ft. long, 2–3 in. in diam.—*K. pinnata*, Seem. in Journ. Bot. 1865, 333, not of DC. *Kigelkeia pinnata*, Hiern in Cat. Afr. Pl. Welw. i. 793 (excl. syns.).

Lower Guinea. Angola: Golungo Alto; by streams in Sobatos de Bumba and Bango Aquitamba and about Sange, *Welwitsch*, 489! woods by the River Muia, near Trombeta, *Welwitsch*, 491!

6. **K. Elliotii,** *Sprague.* A tree. Leaves opposite; leaflets 9–15, entire, glabrous, those on young shoots obovate, 3–4 in. long, 1¾–2¼ in. broad, mucronate, finely reticulate on both surfaces, subsessile, those on old shoots elliptic-oblong or ovate-lanceolate, acuminate, 5–7½ in. long, 2¼–2¾ in. broad; midrib and lateral veins deeply impressed on the upper and prominent on the lower surface of mature leaves; petioles of lateral leaflets 1–3 lin. long, of the terminal 1 in. long. Buds rounded, not cuspidate. Calyx 10–11 lin. long, minutely lepidote, glandular above; tube 7 lin. long; lobes 4, subequal, roughly triangular, acute, 3–4 lin. long. Corolla dark red; tube 1¾ in. long; lower cylindric portion 10–11 lin. long; lobes 1–1¼ in. long. Stamens inserted 9–11 lin. above the base of the corolla-tube; anthers 4½ lin. long. Disc not lobed. Ovary 3–4 lin. long, glandular; stigma-lobes obovate, toothed on their upper margin. Fruit cylindric, 10–16 in. long, 3–5 in. in diam.

Upper Guinea. Sierra Leone: Talla; near Kundita, *Scott-Elliot*, 5037! Scarcies; near Baya-baya, *Scott-Elliot*, 4757!

7. **K. Moosa,** *Sprague.* A shrub or small tree, 6–20 ft. high. Leaves opposite, often paripinnate by suppression of the terminal leaflet; leaflets 9–13, elliptic-oblong or obovate, acuminate, 3–5 in. long, 1½–2¼ in. broad, entire; veins pilose on the upper surface; leaflets on young shoots nearly glabrous except the veins, finely reticulate on both surfaces, those on old shoots scabrid above, shortly pubescent below; midrib and lateral veins impressed on the upper and prominent on the lower surface of mature leaves; petioles of lateral leaflets 2–3 lin. long, of the terminal ½ in. long. Buds rounded, minutely cuspidate. Calyx 15–16 lin. long, pubescent, glandular; tube 8–10 lin. long; lobes 3, the two upper erect, 3½–8 lin. long, the lower usually recurved or uncinate. Corolla-tube 2½ in. long; lower cylindric portion 12–13 lin. long; lobes 1–1¼ in. long. Stamens inserted 8–9 lin. above the base of the corolla-tube; anthers 4 lin. long. Disc not lobed. Ovary 5–6 lin. long, glabrous; stigma-lobes ovate, acuminate, serrulate.

Nile Land. Uganda: Sesse Islands, *Dawe*, 1! 63! West Ankole, 5000 ft., *Dawe*, 412!

8. **K. africana,** *Benth. in Hook. Niger Fl.* 463. A tree, 20–50 ft. high. Leaves opposite; leaflets 7–11, narrowly obovate, elliptic or

oblong-elliptic, $2\frac{1}{2}$–4 in. long, 1–$2\frac{3}{4}$ in. broad, cuspidate, entire or minutely and remotely toothed, glabrous, indistinctly reticulate; lateral veins 7–9 on each side, prominent below; lateral leaflets subsessile; petiole of terminal leaflet 8–11 lin. long. Buds cuspidate at the side. Calyx 8–10 lin. long, irregularly two-lipped, sparsely glandular above; tube 5–6 lin. long; lobes subequal, rounded, 2–4 lin. long. Corolla deep red with yellow veins; tube $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, dilated at the mouth of the calyx; lower cylindric portion 7 lin. long; lobes $\frac{3}{4}$–1 in. long. Stamens inserted $6\frac{1}{2}$–7 lin. above the base of the corolla-tube; anthers $3\frac{1}{2}$–4 lin. long. Disc lobed. Ovary 3 lin. long, lepidote; stigma-lobes obovate. Fruit somewhat compressed, 2 ft. long, 5 in. broad.—*Bignonia africana*, Lam. Encycl. i. 424; Pers. Syn. ii. 172. *Tecoma africana*, G. Don, Gen. Syst. iv. 224.

Upper Guinea. Senegal, *Michelin! Herb. Adanson*, 199 A! Gold Coast: Cape Coast Castle, *Vogel*, 88! Southern Nigeria: Cross River Division; Adaha, *Holland*, 237! 238! 284! Northern Nigeria: Borgu; Palace yard at Wawa, *Barter*, 724!

9. **K. pinnata,** *DC. Prodr.* ix. 247. A tree, 20–50 ft. high. Leaves ternate; leaflets 7–9, elliptic-oblong or obovate, 3–6 in. long, $1\frac{1}{4}$–3 in. broad, abruptly acuminate, rounded or retuse at the apex, serrate or entire, usually glabrous above, glabrous or more or less pubescent below; lateral leaflets subsessile; petiole of terminal leaflet 4–13 lin. long. Buds not distinctly cuspidate. Calyx 1–$1\frac{1}{2}$ in. long, two-lipped, finely pubescent or glabrescent; tube 8–10 lin. long; lobes irregular, unequal, acute, 3–7 lin. long. Corolla claret-coloured; tube $2\frac{1}{2}$–3 in. long, dilated at the mouth of the calyx; lower cylindric portion $\frac{3}{4}$ in. long; lobes pointed, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long. Stamens inserted 9–12 lin. above the base of the corolla-tube; anthers 4–$5\frac{1}{2}$ lin. long. Disc lobed. Ovary 5–6 lin. long, minutely puberulous, sparsely glandular; stigma-lobes ovate, acute. Fruit 1–$1\frac{1}{2}$ ft. long, rounded at the apex; transverse section elliptic, $5\frac{1}{2}$ in. long, $4\frac{1}{2}$ in. broad.—*K. æthiopica*, K. Schum. in Engl. Pfl. Ost-Afr. C. 364, partly; Schinz in Mém. Herb. Boiss. 1900, No. 10, 63; not of Decaisne. *K. Ikbaliæ*, De Wild. in Pl. Nov. Hort. Then. t. 1. *Crescentia pinnata*, Jacq. Collect. iii. 203, t. 18; Fragm. t. 33, fig. 4. *Tanæcium pinnatum*, Willd. Sp. Pl. iii. 312. *Tripinnaria africana*, Spreng. Syst. ii. 842.

Mozamb. Dist. Portuguese East Africa: Mozambique (cult. in Bot. Gard. Pamplemousses), *Bojer!* Quilimane District; Lokoloko, *Scott!* Zambesia, *Stewart!* British Central Africa: Nyasaland, *Buchanan*, 701!

Var. *tomentella*, Sprague. Calyx and lower surface of leaflets densely pubescent or tomentellous. Fruit 20–25 in. long, 3 in. broad.—*K. pinnata*, Klotzsch in Peters, Reise Mossamb. Bot. 195.

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Shupanga, *Kirk!* British Central Africa: Nyasaland; Shibisa, *Meller!* Bechuanaland: Ngamiland; Tamalakane River, *McCabe*, 45! Okavango Valley: Bakalahari Village, *Lugard*, 233! Rhodesia: on an island in the Zambesi River 6 miles above the Victoria Falls, *Cartwright!* by the Zambesi River near the Victoria Falls, *Allen*, 30!

10. **K. æthiopica,** *Decne. in Deless. Ic. Sel. Pl.* v. 39, *t.* 93. A tree, 20–50 ft. high. Leaves ternate; leaflets 7–11, oblong-elliptic or obovate, usually cuspidate, 3–5 in. long, $1\frac{1}{2}$–$2\frac{3}{4}$ in. broad, entire or more or less serrate, scabrid; petioles of lateral leaflets 1–3 lin. long, of the terminal $\frac{1}{2}$–1 in. long. Buds not distinctly cuspidate. Calyx 13–16 lin. long, markedly two-lipped, sparsely glandular above; tube 8–11 lin. long; lobes irregular, unequal, acute, 3–5 lin. long. Corolla reddish-purple; tube $2\frac{3}{4}$–$3\frac{1}{4}$ in. long; lower cylindric portion $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, markedly exceeding the calyx; lobes $1\frac{1}{4}$–$1\frac{1}{2}$ in. long. Stamens inserted 15–17 lin. above the base of the corolla-tube; anthers $4\frac{1}{2}$–5 lin. long. Disc entire. Ovary $4\frac{1}{2}$–5 lin. long, lepidote or glabrous. Stigma-lobes ovate or elliptic. Fruit subcylindric, 1–$1\frac{3}{4}$ ft. long, 3–$4\frac{1}{2}$ in. broad, pointed at the apex.—Martelli, Fl. Bogos. 64; Schweinf. Beitr. Fl. Aethiop. 97; K. Schum. in Ann. Istit. Bot. Roma, vii. 43; Almagià in Ann. Istit. Bot. Roma, viii. 122. *K. pinnata*, Oliv. in Trans. Linn. Soc. xxix. 124, not of DC. *Sotor æthiopum*, Fenzl in Ber. xxi. Versamml. Deutsch. Naturf. 1843, 168.

Nile Land. Without precise locality, *Petherick!* Eritrea: Keren, 4500 ft., *Beccari*, 4! Galabat: Matamma, *Schweinfurth*, 1954! Soudan: Khartoum, *Schweinfurth*, 963! 855! White Nile, Sabatier! Sobat River, below Amol, *Muriel*, 101! Bahr-el-Ghazal: Port Reck, *Schweinfurth*, 1267! *Heuglin*, 34! Jur: Jur Ghattas, *Schweinfurth*, 1346! Uganda: Madi, *Grant!*

Var. *abyssinica*, Sprague. Corolla smaller; cylindric basal portion of tube 1 in. long.—*K. abyssinica*, A. Rich. Tent. Fl. Abyss. ii. 60, t. 75.

Nile Land. Abyssinia: by the River Mareb, *Petit.* Upper Sennar: Fazokl, *Kotschy*, 403! Gebel Kassan, *Cienkowsky*, 81! 82!

Var. *bornuensis*, Sprague. Calyx 10–12 lin. long, puberulous; lobes subequal. Ovary and disc glandular; stigma-lobes obovate.

Upper Guinea. Northern Nigeria: Bornu, *Vogel*, 83!

Var. *usambarica*, Sprague. Leaflets very scabrid. Calyx 10 lin. long, 2-lipped, puberulous. Corolla-tube 2 in. long; lobes 7 lin. long. Stamens inserted 12 lin. above the base; anthers 3 lin. long, Stigma-lobes obovate.—*K. æthiopica*, Engl. Glied. Veg. Usambara, 34.

Mozamb. Dist. German East Africa: Usambara: scattered along the banks of streams between Buite and Mlalo, *Holst*, 2404!

ORDER XCVII. **PEDALINEÆ.** (By O. Stapf.)

Flowers hermaphrodite, zygomorphic. Calyx divided nearly to the base into 5 segments. Corolla gamopetalous; tube obliquely campanulate, funnel-shaped or cylindric, often gibbous or spurred at the base of the back; limb obscurely 2-labiate, usually short. Stamens 4, more or less distinctly didynamous with the rudiment of the fifth present (very rarely 2 fertile and 2 staminodes), inserted and enclosed in the corolla-tube, rarely shortly exserted; anther-cells 2, dehiscent longitudinally, hanging from the apex of the connective and often somewhat divergent, or dorsally attached to it and parallel; connective nearly always with an apical gland. Hypogynous disc always more or less developed, often

asymmetric. Ovary superior (very rarely inferior), sessile, 2- (rarely 1-) 3- or 4-celled; cells often completely or incompletely divided by spurious septa; style filiform, slightly exceeding the anthers; stigma 2-lobed, lobes ovate to linear; placentas central; ovules 1 to many in each cell. Fruit very variable, dehiscent or indehiscent, often provided with spines, horns or wings. Seeds 1 to many in each cell, sometimes winged, with a delicate or stout testa; albumen very thin. Embryo straight; cotyledons flat; radicle short.—Annual or perennial herbs, rarely shrubs or small trees, more or less covered with sessile mucilage-glands (at least the younger parts). Leaves opposite or the upper alternate. Flowers mostly axillary and solitary, rarely in few- to many-flowered axillary and terminal inflorescences; pedicels usually with nectarial glands (modified flower-buds) at the base.

Species about 60 in the tropics and the extra-tropical countries of the southern hemisphere of the Old World.

All the African *Pedalineæ* belong to the tribe *Pedalieæ*.

* Unarmed herbs with solitary or fascicled flowers in the leaf-axils.

† Ovary and fruit 2-celled, cells undivided.

Ovules 1–12 in each cell; fruit indehiscent (where known).

Corolla not or only slightly gibbous at the base.

Fruit quadrangular-pyramidal with or without a stout spine at the base of each angle; annual herbs . . . 1. PEDALIUM.

Fruit winged; perennial herbs with a frequently swollen persistent stem-base . . . . . 2. PTERODISCUS.

Corolla with a large sac-like gibbosity at the base . . . . . 3. HOLUBIA.

Ovules numerous in each cell; fruit tardily dehiscent, armed with hook-bearing horns 4. HARPAGOPHYTUM.

†† Ovary and fruit 2-celled, cells completely or incompletely divided by spurious septa.

False septa of ovary and fruit imperfect towards the apex; fruit a loculicidal, many-seeded capsule.

Cells of ovary and capsule very unequal, the posticous small and indehiscent . . 5. ROGERIA.

Cells of ovary and capsule equal.

Capsule acute or beaked, without lateral appendages . . . . . 6. SESAMUM.

Capsule with 2 divergent horns or spines at the apex . . . . . 7. CERATOTHECA.

Ovary and fruit completely divided by false septa.

Fruit without central spines; ovules 3 in each division . . . . . 8. PRETREOTHAMNUS.

Fruit disc-shaped, with 2 central spines; ovules 2 in each division . . . 9. PRETREA.

††† Ovary and fruit 1-celled with a rudimentary septum . . . . . 10. LINARIOPSIS.

** Spinous shrubs or small trees. Flowers in the axils of much reduced bracts in terminal and subterminal few-flowered racemes.

Corolla-tube cylindric, very slightly curved, spurred	11. SESAMOTHAMNUS.
Corolla-tube sigmatoid, spurless	12. SIGMATOSIPHON.

1. **PEDALIUM,** Linn.; Benth. et Hook. f. Gen. Pl. ii. 1056.

Calyx small, 5-partite. Corolla-tube funnel-shaped, gradually widened from a slender base; limb spreading, obscurely 2-lipped; lobes orbicular, subequal. Anther-cells ovate, pendulous from the apex of the connective, dehiscing longitudinally. Disc small, equal. Ovary 2-celled; cells undivided; ovules 2 in each cell, from above the middle of the septum. Fruit indehiscent, hard, quadrangular, with or without conical spreading spines at the base of the angles. Seeds 1–2 in each cell, pendulous; testa delicately punctate.—Annual succulent herbs. Leaves entire or coarsely dentate. Flowers yellow, solitary in the axils of the leaves.

Species 2, 1 also in South India and Madagascar.

Fruit with a conic spreading spine at the base of each angle	1. *P. Murex.*
Fruit spineless, with tubercles on the faces	2. *P. busseanum.*

1. **P. Murex,** *Linn. Syst. ed.* x. 1123. Stem simple or branched, from a few inches to more than a foot high, like the whole plant more or less glandular. Leaves elliptic or obovate, obtuse with a usually acute base, coarsely and irregularly toothed, 1–2 in. long, $\frac{3}{4}$–$1\frac{1}{2}$ in. broad; petiole up to 1 in. long. Pedicels slender, about $1\frac{1}{2}$ lin. long. Calyx 1 lin. long; segments lanceolate-triangular, acute. Corolla yellow, 1 in. long or more; limb 7–9 lin. across; lobes $2\frac{1}{2}$–3 lin. across. Fruit pyramidal, abruptly contracted into a short hollow terete base with 1 spine at the base of each angle, and small tubercles or raised lines on the faces, $\frac{1}{2}$–$\frac{3}{4}$ in. long.—Gaertn. Carp. t. 58; DC. Prodr. ix. 256; Wight, Icon. t. 1615; Decne in Ann. Sc. Nat. 5me sér. iii. 330; Schweinf. Beitr. Fl. Aethiop. 97; Engl. Pfl. Ost-Afr. B. 156, C. 364. *P. muricatum,* Salisb. Prodr. 104. *P. microcarpum,* Decne, l. c. 332. *Rogeria microcarpa,* Klotzsch in Peters, Reise Mosamb. Bot. 190.

Nile Land. Eritrea: Shoho; Wadi Togodele, *Ehrenberg!* Mount Ghedem near Massaua, 500–1000 ft., *Schweinfurth & Riva,* 200! British East Africa: Witu, *Thomas,* 166! Nyika Country, near Mombasa, *Wakefield!*

Mozamb. Dist. Zanzibar, *Hildebrandt,* 989! German East Africa, *Hannington!* Portuguese East Africa: Mozambique, *Forbes! Kirk!* near Sena, *Peters.*

Also in India and Madagascar. The leaves are eaten as a vegetable.

2. **P. busseanum,** *Stapf.* Stem branched below (including the branches) 8–12 in. high. Leaves obovate-spathulate to oblanceolate, obtuse or subobtuse, attenuated into a petiole (up to 4 lin. long), $1\frac{1}{4}$–$1\frac{1}{2}$ in. long,

$2\frac{1}{2}$–4 lin. broad, entire. Pedicels $1\frac{1}{2}$–2 lin. long. Calyx $1\frac{1}{4}$ lin. long; segments lanceolate-triangular, acute. Corolla-tube $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, 3–4 lin. wide above the middle, violet at the base, otherwise yellow; limb $1\frac{1}{2}$ in. across; lobes rotundate, 3 lin. across. Fruit ovoid, quadrangular, without spines at the base of the angles, but with tubercles on the faces, 7–8 lin. long, 4–5 lin. in diam.—*Pedaliophytum busseanum*, Engl. Jahrb. xxxii. 111, t. v.

Mozamb. Dist. German East Africa: in meadows near Kwa-Mbaramula, near the Rovuma River, *Busse*, 1046.

2. **PTERODISCUS**, Hook.; Benth. et Hook. f. Gen. Pl. ii. 1057.

Calyx small, 5-partite. Corolla-tube funnel-shaped, oblique or slightly gibbous at the base; limb spreading, subbilabiate; lobes orbicular, subequal. Stamens didynamous; anthers converging; anther-cells ovoid, divergent, pendulous from the apex of the connective, dehiscing by a short longitudinal slit. Disc enlarged posticously. Ovary 2-celled; cells undivided; ovules 1–2 in each cell from above the middle of the septum or 10–12 in 2 series. Fruit indehiscent, laterally compressed with 4 longitudinal wings, unarmed; pericarp spongy, with large cavities between the wings. Seeds 1–2 in each cell, pendulous; testa finely honeycombed.—Perennial succulent herbs. Stem tuberous at the base. Leaves coarsely dentate to pinnati-laciniate, rarely sub-entire. Flowers solitary, shortly pedicelled in the axils of the leaves, yellow or purple.

Species about 14, 2 of them in South Africa.

Ovules 1–2 in each cell; corolla purple, rarely bright orange or brick-red (species of South and South-west Africa).

Corolla purple.

Corolla-tube widened almost from the base, nearly symmetric, funnel-shaped, $1\frac{1}{2}$–2 in. long . 1. *P. speciosus.*

Corolla-tube cylindric and very slender to the middle, then gradually widened, slightly asymmetric, $1\frac{1}{4}$ in. long . . . . 2. *P. Elliottii.*

Corolla-tube widened from the base, asymmetric, slightly inflated at the middle on the upper side, often curved or twisted, $1\frac{1}{3}$–$1\frac{2}{3}$ in. long . 3. *P. ngamicus.*

Corolla bright orange to brick-red . . . . 4. *P. aurantiacus.*

Ovules 10–12 in each cell (where known); corolla usually yellow with or without purple markings in the throat (species of East Africa).

Leaves homœomorphic, the extremes in the same individual clearly connected by intermediate forms.

Leaves pinnatifid in the lower part, $2\frac{1}{2}$ in. long: segments 6 lin. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad . . 5. *P. kellerianus.*

Leaves entire, repand or with a few short irregular teeth.

Leaves $1\frac{1}{2}$–3 times longer than broad.

Corolla 2 in. long . . . . . 6. *P. somaliensis.*

Corolla about 1 in. long.
Leaves spathulate, narrowed from the middle downwards . . . . 7. *P. Ruspolii.*
Leaves broad-elliptic, shortly cuneate to subtruncate at the base . . . 8. *P. Wellbyi.*
Corolla 8–9 lin. long.
Leaves elongate-oblong, subacute up to $2\frac{1}{2}$ in. long . . . . . 9. *P. intermedius.*
Leaves elliptic to obovate-elliptic, 1–$1\frac{1}{2}$ in. long . . . . . 10. *P. undulatus.*
Leaves more than 3 times longer than broad, lanceolate
Leaves $1\frac{2}{3}$–$2\frac{1}{2}$ in. long, 3–5 lin. broad, long-petioled . . . . . 11. *P. angustifolius.*
Leaves 5–9 lin. long, 1–$1\frac{1}{4}$ lin. broad, subsessile . . . . . 12. *P. saccatus.*
Leaves heteromorphic, lowest broad-elliptic, the following linear-lanceolate to linear . . . 13. *P. heterophyllus.*

1. **P. speciosus,** *Hook. in Bot. Mag. t.* 4117. Tuber globose, up to $2\frac{1}{2}$ in. in diam. Stem densely glandular like the whole plant when young, 3–6 in. high. Leaves rather numerous, crowded on the upper part of the stem, linear to linear-oblong, irregularly sinuate-dentate to shortly pinnati-laciniate, rarely subentire, $1\frac{1}{2}$–3 in. long, 2–6 lin. (in cultivated specimens to 9 lin.) wide, gradually narrowed into a short petiole. Pedicels 2–$2\frac{1}{2}$ lin. long, slender. Calyx up to 2 lin. long; segments lanceolate, acuminate. Corolla throat villous; tube symmetric or almost so, gradually widened from above the base to the middle, then slightly constricted and widened again towards the mouth, $1\frac{1}{2}$–2 in. long, bright red-purple; limb $1\frac{1}{4}$–$1\frac{1}{2}$ in. across. Filaments bearded at the very base, otherwise glabrous, the longer 5–6 lin. long. Ovule 1 in each cell. Fruit suborbicular, cordate at the base, not or obscurely emarginate at the apex, $\frac{1}{2}$–$\frac{3}{4}$ in. long, including the wings which are $1\frac{1}{2}$–$2\frac{1}{2}$ lin. broad.—Decne in Ann. Sc. Nat. 5me sér. iii. 335; Stapf in Dyer, Fl. Cap. iv. ii. 456.

Mozamb. Dist. British Central Africa: Kalahari Desert, south of the Zuga River, *McCabe,* 5! Rhodesia: Shasha River, *Rand,* 197!

Also in South Africa.

Franchet (*Sert. Somal.* 41) indicates *P. speciosus* also as collected by Révoil near Tigieh in the country of the Medjourtines (Eastern Somaliland); but there is little doubt that the determination is incorrect.

2. **P. Elliottii,** *Baker.* Tuber unknown. Stem moderately glandular-mealy. Leaves densely glandular-mealy below, very sparingly above, ovate-lanceolate to oblong from a cuneate base, entire or with slightly wavy margins or very sparingly toothed, $1\frac{1}{2}$–2 in. long, up to 7 lin. broad; petiole up to 1 in. long. Pedicels 1 lin. long. Calyx-tube more or less loosely hairy within, 1 lin. long; segments lanceolate, acute. Corolla wine-red, passing into yellow below; tube cylindric and very slender up to the middle then gradually widened into the wide mouth, very slightly asymmetric, $11\frac{1}{4}$ in. long; limb $1\frac{1}{2}$ in. across.

Filaments bearded at the very base only, longer 6 lin. long. Ovules 2 in each cell superposed.

Mozamb Dist. British South Africa: Matabeleland, *Elliott!*

3. **P. ngamicus,** *N. E. Brown.* Tuber obconic-cylindric, rising 3–3½ in. above the ground, about 2 in. thick, more or less divided at the top, producing numerous branches from the short thick divisions. Branches 4–9 in. high, more or less glandular-mealy. Leaves densely glandular-mealy, particularly below, oblong, sinuously pinnati-lobate, obtuse or subacute, cuneate at the base, 1–2½ in. long, ½–1 in. broad; lobes up to 6 lin. long, deltoid to linear-oblong, obtuse; petiole 5–8 lin. long. Pedicels 1–4 lin. long. Calyx 1–2½ lin. long; segments lanceolate, acute. Corolla purple with the inside of the tube yellow; tube gradually widened from the base upwards, asymmetric, straight on the lower and slightly inflated at the middle on the upper side, often more or less curved or twisted, sparingly hairy in the throat, 1⅓–1⅔ in. long, almost ½ in. wide at the mouth; limb 1–1½ in. across. Filaments hairy at the base, glabrous above or nearly so, the longer 5½ lin. long. Ovule 1 in each cell. Fruit orbicular, emarginate at both ends, 1¼–1⅓ in. long, wings up to ½ in. broad.

Mozamb. Dist. Bechuanaland: Ngamiland; Kwebe Hills, 3000 ft., *Lugard*, 136A! Lake Ngami, *Chapmann!*

A specimen collected in 1870 by Baines on his expedition to the gold-fields between the Limpopo and Zambesi Rivers (very probably in Matabeleland) agrees in the mode of growth exactly with *P. ngamicus*, but it has smaller leaves and flowers, the corolla-tube scarcely exceeding 1 in.

4. **P. aurantiacus,** *Welw. in Trans. Linn. Soc.* xxvii. 53. Tuber thick, fusiform. Stem decumbent or erect, 1–1½ ft. long, over 2 lin. thick, glandular-mealy. Leaves oblong from a cuneate base, irregularly repand or sinuate-dentate, obtuse, 2–2½ in. long, ½–1 in. broad, densely glandular-mealy below, almost glabrous above. Pedicels 1½ lin. long. Calyx 1½ lin. long; segments linear-lanceolate. Corolla intensely orange coloured; tube cylindric from an asymmetric contracted base, suddenly widened into the limb, about 8 lin. long, hairy within in front, almost villous in the throat; limb 1¼ in. across, crisped and loosely hairy. Filaments hairy at the base only, the longer 5½ lin. long. Ovule 1 or 2 (?) in each cell. Fruit orbicular, 1¼ in. long and broad, cordate at the base, not emarginate at the apex, wing ½ in. broad.—Engl. Jahrb. x. 255; Hiern in Cat. Afr. Pl. Welw. i. 795; Aschers. in Verhandl. Bot. Ver. Brandenb. xxx. 181; Schinz, Deutsch Südwest Afr. 565. *P. brasiliensis*, Asch. ex Schinz, l. c. 264, not in Verhandl. Bot. Ver. Brandenb. xxx. 182.

Lower Guinea. Angola: Mossamedes; banks of the Bero River, *Welwitsch*, 1658! German South-west Africa: Hereroland, near Usakos, 3000 ft., *Marloth*, 1436! and without precise locallty, *Lüderitz.* Amboland; Olukonda, *Schinz!* Dammaraland *Een!*

5. **P. kellerianus,** *Schinz in Bull. Herb. Boiss.* iv. 453. Root-stock tuberous. Leaves lanceolate, pinnatifid in the lower part, 2½ in.

long, half as broad ; segments lanceolate, acute, up to $\frac{1}{2}$ in. long, $\frac{1}{2}$–$1\frac{1}{2}$ lin. broad. Corolla yellow, about $1\frac{1}{4}$ in. long, trumpet-shaped, externally densely glandular-mealy. Fruit up to 17 in. long, with wings 2 lin. broad.

Nile Land. Somaliland : Abdallah, *Keller*, 114 ; Tuju Steppe, *Keller*, 115.

6. **P. somaliensis,** *Baker.* Stem eglandular. Leaves obovate-deltoid, obtuse, subentire, 2–3 in. long, $1\frac{1}{2}$–2 in. broad, more or less mealy-glandular when young, soon glabrescent ; petiole up to 2 lin. long. Flowers solitary in the axils of the leaves ; pedicels slender, 2–3 lin. long. Calyx nearly 2 lin. long ; segments lanceolate-subulate. Corolla orange-coloured with a purple blotch in the throat, funnel-shaped, symmetric, gradually widened from the base, 2 in. long ; tube 2 lin. wide at the middle, over $\frac{1}{2}$ in. at the mouth, hairy within, almost villous in the throat ; lobes 4 lin. long and broad. Disc small, equal or nearly so. Filaments hairy at the base, the longer $4\frac{1}{2}$ lin. long. Ovary laterally compressed, 4-angular. Ovules up to 12 in each cell, 2-seriate.—*Pedalium sp.*, Oliver in James, Unknown Horn of Africa, 321.

Nile Land. Somaliland : Harradigit, *James & Thrupp !*

7. **P. Ruspolii,** *Engl. in Ann. Istit. Bot. Roma*, vii. 31. Rootstock pale brown, 4–6 in. long. Stems several, ascending from the base, glabrous. Leaves opposite, fleshy, spathulate, obtuse, quite entire, narrowed from the middle to the petiole, clothed, especially beneath, with pale grey glands, the upper $2\frac{1}{2}$ in. long, 10–12 lin. broad, the lower smaller. Flowers solitary in the axils of the upper leaves ; pedicels $\frac{1}{4}$ in. long. Calyx-tube short ; lobes linear-lanceolate, very acute, 1 lin. long. Corolla-tube funnel-shaped, nearly 1 in. long, violet, with white hairs at the middle ; limb orange, half as long as the tube ; lobes obovate, 5 lin. long and broad.—Engl. Jahrb. xxxii. 112.

Nile Land. Somaliland : near the River Daua, at Hamæ, *Riva*, 1637, and at Sole, *Riva*, 1101.

8. **P. Wellbyi,** *Stapf.* Persistent base of the stem cylindric or clavate, 2–3 in. long, 3–4 lin. thick, bark papery, peeling off ; shoots few, 2–4 in. long, glaucous and granular-glandular like the whole plant. Leaves broad-elliptic, obtuse, shortly cuneate to almost truncate at the base, 1–$1\frac{1}{2}$ in. long, 8–10 lin. broad, subentire or remotely repand, undulated, sparingly glandular above ; petioles up to 6 lin. long. Pedicels almost 3 lin. long. Calyx $\frac{3}{4}$–1 lin. long ; segments lanceolate. Corolla orange coloured, streaked with purple in the throat ; tube slender, gibbous at the base, otherwise almost symmetric, 1 in. long, $1\frac{1}{2}$–2 lin. wide at the middle, and over 6 lin. at the mouth, villous in the throat ; limb 10 lin. across ; lobes about 3 lin. long. Long filaments 5 lin. long, hairy all along, short filaments bearded at the base. Ovules 2-seriate, about 5 in each row. Fruit unknown.

Nile Land. Uganda : by the Turkwel River, West of Lake Rudolf, *Wellby !*

Similar to *P. undulatus*, but distinguished by the flowers, which are longer and have a much larger limb.

9. **P. intermedius,** *Engl. Jahrb.* xxxii. 112. Rootstock napiform. Stem short, forked, 6 in. long. Leaves opposite, elongate-oblong, subacute, 2½ in. long, 10 lin. broad, rather fleshy, mealy-glandular beneath, entire or slightly undulate; lower petioles 5–10 lin. long. Flowers solitary in the axils of the leaves on short pedicels. Calyx 1–1½ lin. long; segments elongate-triangular, acute. Corolla-tube funnel-shaped, 9 lin. long, 1½ lin. wide at the middle; limb orange; lobes orbicular, 2½ lin. long and broad.

Nile Land. Somaliland: country of the Arusi Gallas, near Bucker, *Ellenbeck*, 2020.

10. **P. undulatus,** *Baker f. in Journ. Bot.* 1899, 62. Stem cylindric, over 3 lin. thick at the base, covered with papery greyish bark, then sparingly branched; branches slightly glandular-mealy, almost 6 in. long. Leaves mostly elliptic to obovate-elliptic, 1–1½ in. long, 6–10 lin. broad, remotely repand to repand-crenate, undulate, more or less glandular-mealy on both surfaces, especially beneath, or almost quite glabrous above; petioles 6 lin. long. Pedicels scarcely longer than the calyx. Calyx ¾–1 lin. long; segments lanceolate. Corolla funnel-shaped, 8 lin. long; tube somewhat oblique and curved, rather slender; limb 4 lin. across; lobes orbicular, upper 1 lin. long, slightly broader. Filaments hairy at the base only. Fruit suborbicular in outline, 6–7 lin. long, rather broader, subcordate at the base, not emarginate at the apex.

Nile Land. British Somaliland: Wagga Mountains, *Mrs. Lort-Phillips!*

11. **P. angustifolius,** *Engl. Jahrb.* xix., 155. Rootstock thick. Stems several, simple or branched near the base, purple, up to 4 in. long. Leaves crowded, lanceolate, attenuate at the base into a long petiole, entire or wavy or irregularly toothed, 1⅔–2½ in. long, 3–5 lin. broad, green, glandular-mealy on both surfaces. Pedicels ¾–1 lin. long. Calyx ¾ lin. long; segments lanceolate. Corolla orange-yellow; tube elongate-cylindric, 10–12 lin. long, 1 lin. wide; upper lip half as long as the lower, its lobes ¾–1 lin. long and 1½ lin. broad, intermediate lobe of the lower lip obovate, 2–2½ lin. long, all the lobes crisped and ciliate. Fruit unknown.—Engl. Pfl. Ost-Afr. C. 364.

Mozamb. Dist. German East Africa: between Magu and Kagehi, *Fischer*, 462.

12. **P. saccatus,** *S. Moore in Journ. Bot.* 1899, 62. Rootstock branched; branches divaricate, up to 4 in. long, 3–4 (and in places to 5) lin. thick, covered with rough brown bark, producing from the ends short simple leaf- and flower-bearing densely glandular-mealy shoots up to 2 in. long. Leaves subsessile, linear-lanceolate, undulate, rarely denticulate, 5–9 lin. long, 1–1¼ lin. broad, densely glandular-mealy on

both surfaces. Pedicels about as long as the calyx. Calyx 1–1¼ lin. long; segments lanceolate, shortly acuminate. Corolla apparently purple and yellow; tube trumpet-shaped, 9–13 lin. long, 1 lin. wide near the base, 2½–3 lin. wide towards the mouth, distinctly saccate at the base; limb over ½ in. across; lobes orbicular, 1¼–2 lin. long, 2–2½ lin. broad. Longer filaments 5½ lin. long.

Nile Land. Somaliland: Wagga Mountains, *Mrs. Lort-Phillips!* Habrawal Country, Gun Libar (?), 5900 ft., *Donaldson Smith!*

13. **P. heterophyllus,** *Stapf.* Stem base unknown, annual shoots over 2 in. long, slender, more or less glandular-mealy. Leaves heteromorphic, lowest pair with very small (2 lin. long) oblong to elliptic blades on slender petioles (4 lin. long), the next more or less elliptic from a cuneate base, obtuse, subrepand, about 10 lin. long, 5–6 lin. broad, on petioles 6 lin. long, the upper 5–6 pairs linear-lanceolate to linear, with 1 or 2 short obtuse teeth on each side, up to more than 2 in. long and 2–3 lin. broad, long attenuate into the slender petiole (up to 9 lin. long), densely mealy-glandular below, much less so or almost glabrous above. Pedicels up to 2 lin. long. Calyx 1½ lin. long; segments lanceolate, acuminate. Corolla lurid-purple with a dark blotch in the throat; tube funnel-shaped, about 10 lin. long, almost straight with an oblique mouth, loosely hairy in the throat, ½ lin. wide near the base, 2 lin. wide, about 7 lin. from the base; limb 5–7 lin. across; lobes orbicular, 1½–2 lin. long and distinctly broader. Longer filaments 4 lin. long, hairy all along, shorter near the base only. Ovules 2-seriate, 5–6 in each row.—*P. speciosus*, Oliver in James, Unknown Horn of Africa, 321, not of Hook.

Nile Land. Somaliland: without precise locality, *James & Thrupp!*

Imperfectly known species.

14. **P. Gayi,** *Decne in Ann. Sc. Nat.* 5me *sér.* iii. 336. Stem glabrous, sparingly granular (glandular-mealy) in the upper part. Leaves obovate-spathulate, denticulate, 2–3 in. long, 1 in. broad, attenuate at the base, sparingly granular (glandular-mealy) on the back, particularly the upper leaves; petiole 2–2½ lin. long. Pedicels and calyx unknown. Corolla 1½ in. long; tube cylindric for almost 3 lin. from the base, then gradually widened, obconic and oblique, 4–5 lin. wide at the mouth, pale purple; limb blackish-purple; lobes ciliolate with rigid yellow hairs.—*P. brasiliensis*, Aschers. in Verhandl. Bot. Ver. Brandenb. xxx. 182. *Rogeria brasiliensis*, J. Gay in Ann. Sc. Nat. 1re sér. i. 457, and in DC. Prodr. ix. 257.

Lower Guinea (?) Quipungo.

The characters given above are taken from Gay's manuscript monograph of the order, now at Kew. Gay described the species from an imperfect specimen, preserved in the Paris Herbarium. He does not quote any locality in the *Annales des Sciences Naturelles*, and in his manuscript he simply says "Habitat in Brasilia."

Decaisne indicates, however, Quipungo as the habitat, "a locality on the West Coast of Africa." Ascherson, l.c., suggests that Kipungo in Mossamedes might have been meant, and further that the Paris plant is identical with Welwitsch's *P. aurantiacus*, which can hardly be the case judging from Gay's description.

3. **HOLUBIA**, Oliver in Hook. Ic. Pl. t. 1475.

Calyx small, 5-partite; segments subulate-lanceolate. Corolla-tube cylindric at the middle, funnel-shaped at the mouth, produced posticously into a large sac at the base; limb spreading, obscurely 2-labiate; lobes 5, suborbicular, subequal. Stamens 4, didynamous, inserted low down in the corolla-tube; filaments long, filiform; anthers parallel, ovoid, dorsifixed, dehiscing longitudinally by a short slit. Disc free, posticously dilated, fleshy. Ovary laterally slightly compressed, quadrangular (angles keeled), 2-celled; cells undivided, equal; ovules 2-seriate, 8 in each cell. Fruit unknown.—A herb. Leaves palmatinerved, more or less lobed. Flowers solitary in the axils of the leaves, greenish-yellow.

Species 1, extending into South Africa.

1. **H. saccata,** *Oliver, l. c.* Flowering branches glabrous or almost so. Leaves orbicular-ovate, truncate or slightly cordate at the base, very obtuse, slightly lobed or sinuate, 1–1½ in. long and broad, sparingly mealy-glandular below, glabrous above; petiole 1–1¼ in. long. Corolla-tube (from the calyx to the mouth) 1¼–1½ in. long; sac up to 1 in. long and over ½ in. wide; limb 2 in. wide.—Stapf in Dyer, Fl. Cap. iv. ii. 457.

Mozamb. Dist. Bechuanaland: Kalahari Desert, near Mamunwe, *Lugard*, 240 !.

Also in South Africa.

4. **HARPAGOPHYTUM,** DC.; Benth. et Hook. f. Gen. Pl. ii. 1057.

Calyx campanulate, 5-partite; segments lanceolate, narrow. Corolla-tube funnel-shaped, equal or slightly gibbous; limb oblique; lobes orbicular, slightly unequal. Anther-cells parallel, pendulous from the apex of the connective, dehiscing longitudinally at the base. Ovary 2-celled; cells undivided; ovules many in each cell, biseriate. Fruit an ovoid or oblong, 2-celled, tardily dehiscent capsule, flattened contrary to the septum, armed along the edges with 2 rows of long horny arms bearing recurved spines. Seeds numerous, obovate, horizontal.—Perennial herbs with a stout rootstock and long trailing stems. Leaves shortly petioled. Flowers solitary on short pedicels in the axils of the leaves.

Species 2–3 in Tropical and South Africa.

1. **H. procumbens,** *DC. Prodr.* ix. 257. Stem like the whole plant subglabrous (apart from the mucilage glands) or the younger parts more or less minutely hispidulous. Leaves rotundate-ovate to rhomboid or ovate in outline, pinnatilobed to or beyond the middle, $\frac{1}{2}$–$1\frac{1}{2}$ in. long, about $\frac{1}{2}$–1 in. broad, shortly cuneate at the base, glaucous or whitish and powdery-glandular below; lobes more or less oblong, obtuse, with 1–3 short, obtuse, irregular teeth; petioles 3–9 lin. long. Pedicels about 3 lin. long. Calyx 2–4 lin. long. Corolla 2–$2\frac{1}{2}$ in. long; tube narrow and cylindric for 4–5 lin. from the base, then widened, trumpet- or funnel-shaped, about $\frac{1}{2}$ in. wide just below the mouth, yellowish below, passing into purple above; limb 1–$1\frac{1}{4}$ in. across, deep purple; lobes suborbicular, broader than long.—DC. in Deless. Ic. Sel. v. 39, t. 94; Engl. Jahrb. x. 255; Stapf in Dyer, Fl. Cap. iv. ii. 458. *H. Burchellii*, Decne in Deless. Ic. Sel. v. 40. *Uncaria procumbens*, Burch. Trav. i, 536, 529 with fig. of fruit.

Mozamb. Dist. Bechuanaland: Ngamiland; Kalahari Desert between Kwebe and Palapye, 3000 ft., *Lugard*, 273! Botletle Valley, *Lugard*, 212, partly!

Var. *sublobatum*, Engl. in Baum, Kunene-Samb. Exped. 370. Leaves rotundate-ovate or broad-elliptic to oblong, rarely obovate-spathulate, repand to shallowly and obtusely lobed and undulate, truncate to cuneate at the base 1–2 in. long, $\frac{2}{3}$ to over 1 in. broad.

Lower Guinea. Angola: near Kabindere on the Kubango River, 3800 ft., *Baum*, 339! German South-west Africa: Amboland; Olukonda, *Rautanen*, 95!

Mozamb. Dist. Bechuanaland: Ngamiland; Botletle Valley, *Lugard*, 212 partly! Kobis, *Baines!* near Lake Ngami, *McCabe*, 46! Matabeleland: Shasha River, *Rand*, 200! and without precise locality, *Elliott!*

The typical form extends to the south as far as the Orange River.

5. **ROGERIA,** J. Gay; Benth. et Hook. f. Gen. Pl. ii. 1057.

Calyx small, 5-partite. Corolla-tube funnel-shaped to almost cylindric, slightly gibbous to saccate on the posticous side of the base; limb spreading, obscurely 2-labiate; lobes suborbicular, subequal. Stamens 4, didynamous, inserted low down in the corolla-tube; filaments long, filiform; anthers parallel, ovate-oblong, dorsifixed. Ovary unequally 2-celled; posticous cell much shorter and smaller, perfectly divided by a spurious septum; anticous cell divided imperfectly (in the lower part); ovules numerous and about 4-seriate in each of the anticous, few and 1-seriate in the posticous divisions. Capsule obliquely ovoid, rostrate, armed with 2–8 conic spines or tubercles, the large anterior cell tardily dehiscent loculicidally to the middle, the posticous indehiscent. Seeds oblong, angular; testa reticulate. Leaves broad, long-petioled. Flowers in axillary few- or 1-flowered cymes on short pedicels, violet or white.

Species 3, one of them extending into South Africa.

Leaves more or less 3-lobed; capsule with 4 (–8) spines at the base . . . . . 1. *R. adenophylla.*

Leaves not 3-lobed; capsule with 2 or no spines.

Leaves subentire; capsule with 2 spines at the base of the back	2. *R. longiflora.*
Leaves sinuate-dentate; capsule with 2 gibbosities at the base of the back	3. *R. bigibbosa.*

1. **R. adenophylla,** *J. Gay in Ann. Sc. Nat.* 1re *sér.* i. 457. Stem up to 7 ft. high, mealy-glandular in the upper part. Leaves very broadly obovate, more or less 3-lobed, truncate or shortly cuneate at the base, 2–4 in. long and broad, mealy-glandular particularly below, glaucous, boldly 3-nerved to penninerved; lobes obtuse, remotely repand-dentate; teeth subulate, each with a double-gland at the base. Flowers 3–1 in the axils of the leaves, subsessile. Calyx 1½–2 lin. long; segments linear-lanceolate. Corolla 1½ to almost 2 in. long; tube funnel-shaped from a short slightly gibbous base, 1¼–1½ in. long, about 4 lin. wide above the middle, whitish to orange, densely mealy-glandular; limb deep dull purple or maroon-coloured, over ¾ in. across; lobes 4 lin. long, 5 lin. broad. Capsule 1–1¼ in. long with 4 spreading spines up to 3 lin. long below the middle, often with 4 smaller ones alternating with them. Seeds 1½–1¾ lin. long.—DC. Prodr. ix. 256; Schweinf. Beitr. Fl. Aethiop. 97; Hiern in Cat. Afr. Pl. Welw. i. 796; Stapf in Engl. & Prantl, Pflanzenfam. iv. 3B. 262. *Pedalium Caillaudii,* Del. & Kotschy, Pl. Nub. No. 151. *P. Rodgeria,* Decne in Ann. Sc. Nat. 5me sér. iii. 331.

Upper Guinea. Senegal: near Richardtol, *Döllinger!* Northern Nigeria: Kuka, *Vogel,* 48!

Nile Land. Cordofan, *Kotschy,* 108! 290! *Pfund,* 348! 781! Sudan: banks of the White Nile, *Schweinfurth,* 946! Arashkol Mountain, *Kotschy,* 151! Blue Nile, *Muriel,* 40! Nubia: Uaratab Mountain, near Suakin, *Schweinfurth,* 1425!

Lower Guinea. Angola: Mossamedes; banks of the Bero and Maiombo Rivers, *Welwitsch,* 1657! Pedra do Rei, near Boca do Bero, *Welwitsch,* fruit, 42

2. **R. longiflora,** *J. Gay in Ann. Sc. Nat.* 1re *sér.* i. 457. Stem mealy-glandular only at the very top. Leaves ovate to rotundate-ovate, subentire with a somewhat wavy margin, obtuse at the apex, subacute to subtruncate at the base, 2–3½ in. long, 1½–3½ in. broad, mealy-glandular and glaucous below, boldly 3-nerved. Flowers 2–1 in the axils of the leaves; pedicels densely mealy-glandular, up to 2 lin. long. Calyx 2 lin. long; segments lanceolate, subequal. Corolla white (*Meerburg*); tube subcylindric, more or less asymmetrically widened at the base, 2–2½ in. long, 1½ lin. wide at the middle, 3 lin. wide near the base, not glandular; limb 1¼–1½ in. in diam.; lobes about 5 lin. long and broad, excepting the lowermost, which is somewhat longer. Fruit oblong, 2 in. long including the beak, with 1 recurved short spine on each side of the base.—DC. Prodr. ix. 257 Harv. Thes. Cap. ii. 12, t. 118; Stapf in Dyer, Fl. Cap. iv. ii. 459. *R. longiflora,* var. *triloba,* Engl. Jahrb. x. 255. *Martynia longiflora,* Royen in Linn. Syst. ed. xii. 412; Meerb. Afbeeld. t. vii. *Pedalium longiflorum,* Decne in Ann. Sc. Nat. 5me sér. iii. 331.

Lower Guinea. Damaraland, *Miss Elliott!* cliffs by the Swakop River, 2600 ft., *Marloth,* 1383!

Also in South Africa. Miss Elliott's specimen has the corolla-tube more widened at the base (4 lin. across) so that it might be described as shortly saccate, and the leaves are much smaller than in the type (1 in. long) and rather penni-nerved with an indication of 3 lobes. It is possibly the same form which Engler described as var. *triloba*.

3. **R. bigibbosa,** *Engl. Jahrb.* x. 256. Stem stout, like the whole plant nearly-glandular all over, swollen and about 5 lin. thick at the middle; internodes 10–15 lin. long. Leaves ovate, coarsely sinuate-dentate, $1\frac{2}{3}$–2 in. long, 1–$1\frac{1}{2}$ in. broad; teeth 2–$2\frac{1}{2}$ lin. long; petioles up to 10 lin. long, persistent. Fruits on short, arrested, leafy branch-lets. Capsule $1\frac{2}{3}$ in. long, 7–8 lin. in diam. where widest, beak curved forwards, base bulging out posticously into 2 gibbosities. Seeds $1\frac{1}{2}$ lin. long.

Lower Guinea. German South-west Africa: Hereroland, Otyimbingue, 3000 ft., *Marloth*, 1485 !

6. **SESAMUM,** L.; Benth. et Hook. f. Gen. Pl. ii. 1059.

Calyx small or middle-sized, 5-partite, usually suboblique. Corolla obliquely campanulate; limb more or less oblique, obscurely 2-labiate, lowest lobe usually distinctly longer than the others. Stamens sub-didynamous, inserted low down in the corolla-tube, not conniving; filaments slender, filiform; anthers dorsifixed, cells parallel, dehiscing longitudinally to the base. Disc annular, equal. Ovary 2-celled; cells divided by a spurious septum almost to the apex; ovules numerous, 1-seriate in each division. Capsule oblong, slightly compressed contrary to the septum, loculicidal towards the base, more or less beaked, without any lateral appendage at the apex. Seeds numerous, compressed, obovate.—Annual or perennial, erect or procumbent herbs. Leaves membranous, sometimes rather firm, petioled or the upper subsessile, polymorphous. Flowers solitary in the axils of the leaves on mostly very short pedicels, pale pink to deep purple.

Species about 18, some extending to South Africa and India.

* Sesamotypus. — Plants distinctly (though sometimes sparingly) pubescent or long-hairy to villous. Leaves undivided, rarely the lower 3-foliolate or 3-partite. Seeds with more or less acute margins, rarely with a narrow membranous rim (*S. antirrhinoides*); faces rugose or smooth.

Prostrate herbs.

Leaves about as long as the internodes, obtuse at the base, shortly but distinctly petioled . . . 1. *S. Heudelotii.*

Leaves much longer than the internodes, subcuneate at the base, sessile . . . . . 2. *S. repens.*

Erect herbs.

Leaves homomorphous, always undivided; seeds more or less radially rugose (rarely granular) on the faces.

Leaf-margins entire or slightly wavy or repand, very rarely with 1–2 irregular teeth ; capsules usually slender (except in *S. rigidum*), rarely more than 2 lin. broad.

Pedicels very short, at length 1–3 lin. long; stem more or less quadrangular and sulcate.

Corolla under 9 lin. long; capsules not or obscurely beaked.

Leaves linear, up to over 2 in. long, 1–2 lin. broad . . . . . 3. *S. pedalioides.*

Leaves lanceolate-oblong, 1–2 in. long, 3–9 lin. broad . . . . . 4. *S. mombanzense.*

Corolla 1–2½ in. long ; capsules beaked.

Corolla under 2 in. long.

Petioles slender, up to 9 lin. long, extrafloral nectaries stipitate.

Margins of seed drawn out into a membranous rim, faces granular . 5. *S. antirrhinoides.*

Margins of seeds acute ; faces radially rugose . . . . . 6. *S. schinzianum.*

Petioles very short or 0 ; extrafloral nectaries sessile.

Leaves linear, 3–¾ lin. broad.

Beak of capsule slender, very acute ; seeds up to ¾ lin. long, faces conspicuously rugose . 7. *S. angustifolium.*

Beak of capsule broad, often obtuse ; seeds 1 lin. long, faces faintly rugose . . . 8. *S. Baumii.*

Leaves lanceolate to linear, 6–2 lin. broad . . . . . 9. *S. calycinum.*

Corolla 2–2½ in. long . . . . 10. *S. angolense.*

Pedicels slender, at length up to 8 lin. long; stem terete . . . . . 11. *S. rigidum.*

Leaves (at least the lowest) often coarsely toothed ; capsules 3½–4 lin. broad . . . . 12. *S. radiatum.*

Lower leaves usually 3-foliolate, upper undivided.

The whole plant densely glandular-hairy ; faces of seeds rugose near the margins with a well-defined smooth area in the centre . . . 13. *S. Marlothii.*

The whole plant sparingly and finely pubescent ; seeds quite smooth . . . . . 14. *S. indicum.*

** Sesamopteris. — Plants glabrous (apart from the mucilage glands), or with few microscopic adpressed hairs on the youngest parts. Leaves (at least the lower and intermediate) 7–3-foliolate or 7–3-partite. Seeds broadly winged (excepting *S. Schenckii*), faces muriculate-foveolate.

Leaves heteromorphous, the upper undivided.

Seeds with an apical and a basal wing . . 15. *S. alatum.*

Seeds wingless . . . . . 16. *S. Schenckii.*

All the leaves 5–3-foliolate . . . . . 17. *S. capense.*

1. **S. Heudelotii,** *Stapf.* Stems slender, trailing, sparingly mealy-glandular and pubescent. Leaves numerous, about as long as the internodes, lanceolate-oblong, acute at the apex, obtuse at the base, entire, $\frac{2}{3}$–1 in. long, 3–$3\frac{1}{2}$ lin. broad, more or less pubescent, densely covered below with white mealy glands; nerves about 4 on each side, raised and conspicuous below; petiole $\frac{1}{2}$–1 lin. long. Pedicels up to 2 lin. long. Calyx 3 lin. long; segments linear-lanceolate. Corolla up to $1\frac{1}{4}$ in. long, finely pubescent, lowest lobe 3 lin. long. Fruit unknown.

Upper Guinea. Senegambia, without precise locality, *Heudelot*, 147!

2. **S. repens,** *Engl. & Gilg in Baum, Kunene-Samb. Exped.* 371. Stems prostrate, up to 2 ft. long, densely pubescent and sparingly mealy-glandular. Leaves very numerous, much longer than the internodes, sessile, oblong, obtuse, subcuneate at the base, entire, about 1 in. long, 3–4 lin. broad, pubescent, mealy-glandular on both sides, particularly below, nerves about 4 on each side, very oblique, impressed above, very prominent below. Pedicels 1–$1\frac{1}{2}$ lin. long. Calyx 2–$2\frac{1}{2}$ lin. long, pubescent; segments lanceolate. Corolla about 1 in. long, pubescent, rose-coloured; lowest lobe depressed, orbicular, 4 lin. long. Capsule 7–8 lin. long, 2 lin. broad. Seeds $\frac{3}{4}$ lin. long, margins acute, sides rather broad, like the flat faces shallowly-pitted.

Lower Guinea. Angola: by the Longa River, between Lazingua River and Quiriri River, 4000 ft., *Baum*, 660!

3. **S. pedalioides,** *Welw. ex Hiern in Cat. Afr. Pl. Welw.* i. 799. Stems erect, branched, rather wiry, up to 2 ft. high, terete or obscurely quadrangular, densely greyish, pubescent or villous with long-spreading gland-tipped hairs; internodes rarely over $\frac{1}{2}$ in. long. Leaves numerous, linear, subacute, attenuate at the base, entire or slightly repand, up to over 2 in. long, 1–2 lin. broad, greyish, pubescent and more or less covered with sessile glands, particularly below; petioles very slender up to 1 lin. long. Pedicels very short in flower, villous, 2-bracteolate; nectaries sessile or subsessile. Calyx $1\frac{1}{4}$ lin. long, greyish-villous; segments lanceolate-linear. Corolla slightly obliquely campanulate, 5–7 lin. long, finely pubescent; lobes very small, lowest 2 lin. long. Capsule ovoid-oblong, subtruncate and slightly emarginate, obtusely quadrangular, 4-sulcate, 4-cornute at the base, 4 lin. long. Seeds 1 lin. long, margins acute or narrowly winged, faces transversely or radially rugose.

Lower Guinea. Angola: Mossamedes; by the River Bero, *Welwitsch*, 1643! between Huilla and Humpata, *Johnston!*

4. **S. mombanzense,** *De Wild. et Durand in Pl. Thonner. Congol.* 36, *t.* 14. Stems erect, branched, $1\frac{1}{2}$ ft. high, sparsely and spreadingly pubescent. Leaves lanceolate-oblong, acute, narrowed towards both ends, entire, 1–2 in. long, 3–9 lin. broad, slightly hairy above, whitish-hairy

below; petioles slender, 2–3 lin. long. Pedicels slender, at first ½ lin. long, at length 2 lin. long, whitish-hairy, 2-bracteolate at the base; bracteoles filiform. Calyx 2–2½ lin. long, hairy; segments lanceolate. Corolla purple, sparsely hairy, obliquely campanulate, 7–8 lin. long; lobes very short, subequal. Capsules 6–9 lin. long, 2½ lin. broad, scarcely beaked, apiculate, covered with long white hairs. Seeds 1¼ lin. long, faces radially rugose, sides pitted, one margin acute, the other rounded off.

South Central. Congo Free State: Mbanza, near Businga, 1300 ft., *Thonner*, 116!

De Wildeman and Durand described and figured (l.c. 37, t. 15) another species as *S. Thonneri*, which they say was collected together with *S. mombanzense* and sent to them under the same number. They further add that they originally referred it to the same species, but finally separated it on account of the anther-cells of the lower pair of stamens being divergent, instead of parallel, and dehiscing with a short slit. The descriptions and figures of the two species agree, however, to such an extent that I cannot help thinking that the difference in the anthers must be due to some anomaly in their development.

5. **S. antirrhinoides,** *Welw. ex Aschers. in Verhandl. Bot. Ver. Brandenb.* xxx. 183. Stems erect, branched, up to 3 ft. high, sparingly branched, like the whole plant softly glandular-hairy, terete below, obscurely quadrangular above, internodes rarely over 1½ in. long. Leaves lanceolate to narrowly elliptic, subobtuse or apiculate, cuneate at the base, entire or obscurely repand, 1–2 in. long, 2–6 lin. broad, dull green, at length glabrescent, with very few sessile glands among the hairs; petiole very slender, up to ½ in. long, upper very short. Pedicels very short, in fruit 2 lin. long; nectaries stipitate. Calyx 2 lin. long, linear-lanceolate. Corolla tubular-campanulate, rose-violet or purple, about 1 in. long; throat 3–4 lin. wide; limb ½ in. in diam.; lowest lobe 3 lin. long and broad, suborbicular, apiculate. Capsule ¾–1 in. long, rounded-quadrangular, deeply 4-sulcate, hairy, beak acuminate. Seeds 1½ lin. long, very strongly compressed, margins narrowly winged, faces finely granular.—Hiern in Cat. Afr. Pl. Welw. i. 798. *Volkameria antirrhinodes*, O. Kuntze, Rev. Gen. Pl. ii. 482.

Lower Guinea. Angola: Mossamedes; banks of the River Bero, *Welwitsch*, 1648! near Giraul, *Welwitsch*, 1655.

6. **S. schinzianum,** *Aschers. in Verhandl. Bot. Ver. Brandenb.* xxx. 182. Stem slender, branched, terete or obscurely tetragonous, like the whole plant densely glandular-villous, whitish or straw-coloured. Leaves oblong-lanceolate to linear, subacute or mucronulate, those of the main stem up to 1⅔ in. long and 4 lin. broad, those of the branches much shorter and narrower, glaucous, attenuated into the petiole, which is up to 9 lin. long in the largest leaves, and very short in the smaller. Pedicels 2 (in fruit up to 3) lin. long; nectaries stipitate. Calyx 1½ lin. long; segments lanceolate. Corolla pale rose-coloured, 1–1¼ in. long, very gibbous above the base. Capsule 9–12 lin. long, 2 lin. broad, beak drawn out into a slender villous acumen. Seeds 1 lin.

long, margins very acute, faces radially striate, sides narrow, transversely striate and pitted.—Engl. Jahrb. x. 257, t. 7, fig. C.

Lower Guinea. Damaraland : near Otyimbingue, *Marloth*, 1401 ! Otyitambe, *Belck*, 23 ; and without precise locality, *Lüderitz*.

7. **S. angustifolium,** *Engl. in Pfl. Ost-Afr. C.* 365. Stem erect, simple or branched, slender, several feet high, obtusely quadrangular, sparingly pubescent or glabrescent, with very few sessile glands among the hairs. Leaves subsessile or the lowest shortly petioled, linear to lanceolate-linear, acute or subacute, cuneate at the base, entire, very rarely repand, 3–1 in. long, 3–1 lin. broad, sparingly pubescent above, more so below on the nerves, glaucous below from sessile glands ; nerves delicate or in the lowest leaves rather prominent below, 7–8 on each side, very oblique ; veins usually quite inconspicuous. Pedicels hardly any in flower, at length 1 lin. long, 2-bracteolate at the base ; nectaries sessile. Calyx 2–3 lin. long ; segments lanceolate-subulate to finely subulate, pubescent and mealy-glandular. Corolla dull rose-colour, obliquely campanulate, 1–1½ in. long, whitish pubescent; lowest lobe orbicular-ovate, rounded, 3–4 lin. in diam. Capsule acuminate-rostrate, 8–10 lin. long, 1¼–1½ lin. wide, pubescent, obtusely quadrangular, 4-sulcate, beak slender. Seeds very broadly obovate, up to ¾ lin. long, margins acute, faces radially or transversely rugose, sides broad, conspicuously transversely rugose and pitted.—*S. indicum,* var. ? *angustifolium,* Oliver in Trans. Linn. Soc. xxix. 131. *S. calycinum,* Engl. Jahrb. xix. 158, not of Welw.

Nile Land. Banks of the White Nile, *Petherick !* Uganda : near Lake Naivasha, 6000 ft., *Scott-Elliot,* 7035 ! Kavirondo, *Scott-Elliot,* 7107 ! near Kampala, *Whyte !* 6-days march from Mumias, *Whyte !*

South Central. Congo Free State : Monbuttu ; Munza, *Schweinfurth,* 3390 !

Mozamb. Dist. Zanzibar, *Hildebrandt,* 1192 ! German East Africa : Bukoba, *Stuhlmann,* 3604 ! Unyamwezi, *Speke & Grant !* Dar-es-Salaam, *Kirk,* 134 ! Lower Rovuma River, *Meller !* and without precise locality, *Hannington !* British Central Africa : South of Lake Tanganyika, *Cameron !* Upper Loangwa River, *Nicholson !*

Engler, in describing this species under the name of *S. calycinum,* Welw., in *Jahrb.* xix. 158, states that the lower leaves are sometimes 3-partite, and usually oblong and coarsely dentate along the whole margin. All the leaves of the specimens enumerated above are quite entire, with the exception of a few on Kirk's specimen from Dar-es-Salam, which are slightly repand. Engler indicates this species also from the following localities in German East Africa :—Usagara ; Mpwapwa, *Stuhlmann,* 270 ; Bagamoyo, *Hildebrandt,* 1192 *b* ; Ugalla, near Gonda, *Böhm,* 30 ; Tabora, *Stuhlmann,* 604.

8. **S. Baumii,** *Stapf.* Stem very slender, erect, up to over 3 ft. high, obtusely quadrangular, sulcate, sparingly pubescent or glabrescent, with very few sessile glands among the hairs. Leaves subsessile, linear, entire, acute, subcuneate at the base, up to 3 in. long, ¾–2 lin. broad, sparingly and minutely pubescent and whitish-glaucous from sessile glands, at length glabrescent above, nerves distinct, about 5 on each

side, very oblique, veins distinct except in the narrowest leaves. Pedicels in flower 4–1 (at length 2) lin. long, minutely 2-bracteolate; nectaries subsessile. Calyx 2 lin. long, whitish glaucous or grey, minutely pubescent; segments linear-lanceolate, acuminate. Corolla pale rose-colour, obliquely campanulate, about $1\frac{1}{4}$ in. long, finely pubescent; lowest lobe broad-ovate, rounded, 3 lin. long and broad. Capsule shortly rostrate, 7–8 lin. long, 2 lin. broad, obtusely quadrangular, 4-sulcate; beak 1 lin. long, rather broad and often obtuse. Seeds 1 lin. long, margins very acute, faces faintly rugose, sides broad, transversely rugulose.—*S. angustifolium*, Engl. in Baum, Kunene-Samb. Exped. 371.

Lower Guinea. Angola: Mossamedes; in sand by the Cunene River between Kiteve and Humbe, 3600 ft., *Baum*, 959!

Very similar to *S. angustifolium*, but differing in the finer indumentum, the shorter and comparatively broader capsules with a short, broad beak and the larger, less rugose seeds.

9. **S. calycinum,** *Welw. in Trans. Linn. Soc.* xxvii. 52. Stem 2–3 ft. high, erect, simple or sparingly branched upwards, with arrested branchlets forming small tufts of leaves in the lower leaf-axils, obtusely quadrangular, sparingly rufo-subhirsute or pubescent and mealy-glandular. Leaves subsessile, lanceolate to linear, obtuse to acute at the apex, cuneate at the base, $2\frac{1}{2}$–1 in. long, 6–2 lin. wide, entire, rarely with 1–2 irregular teeth, finely hirsute above and on the nerves below, at length more or less glabrescent, glaucous from sessile glands below, at least when young; nerves rather prominent below, 4–5 on each side, very oblique, transverse veins distinct. Pedicels $1\frac{1}{2}$–2 (at length over 2) lin. long, ebracteolate; nectaries sessile. Calyx 3–$3\frac{1}{2}$ lin. long, pubescent and mealy-glandular; segments subulate-lanceolate, finely acuminate. Corolla rose-coloured, obliquely campanulate, 1–$1\frac{1}{3}$ in. long, rufo-pubescent; lowest lobe orbicular, subapiculate, $\frac{1}{4}$ in. in diam. Capsule acuminate-rostrate, almost 1 in. long, 2 lin. wide, pubescent, 4-sulcate, obtusely quadrangular. Seeds not quite 1 lin. long, margins acute, faces like the broad sides finely or quite obscurely rugose.—Hiern in Cat. Afr. Pl. Welw. i. 797 (excl. Oliver's syn.).

Lower Guinea. Angola: Pungo Andongo; in dry sandy thickets between Caghuy and Sansamanda, *Welwitsch*, 1644!

Mozamb. Dist. Mashonaland: Six Mile Spruit, near Salisbury, *Hon. Mrs. Evelyn Cecil*, 142!

I find the nectaries to be sessile, not "evidently stipitate," as Welwitsch says. De Wildeman and Durand (*Reliq. Dewèvr.* 173) indicate this species also from the Upper Congo, at Kasongo, where Dewèvre (919) collected it, who describes the corolla as violet with a white tube and a yellow, violet-streaked lip, and states that the natives on the shore of Lake Tanganyika eat it.

10. **S. angolense,** *Welw. Apont. Phyto-Geogr.* 588, *and in Trans. Linn. Soc.* xxvii. 51. Stem erect, 3–8 ft. high, subterete or obtusely quadrangular and sulcate, sparingly pubescent when young, then glabrescent, simple or more or less branched above. Leaves very

numerous, usually longer than the internodes, linear-oblong to sub-lanceolate, rarely elliptic- or ovate-oblong, rounded, subemarginate or sometimes acute at the apex, often mucronulate, narrowed at the base, entire or subrepand with wavy margins, 2–4 in. long, $\frac{1}{3}$–$1\frac{1}{2}$ in. broad, deep green and sparsely pubescent or almost glabrous above, whitish, subtomentose and mealy-glandular below, rather firm, nervation impressed above, slightly raised below; petioles very short or hardly any; upper leaves passing into the similar foliaceous lower bracts. Upper bracts linear, very narrow, acuminate, rapidly decreasing in size. Pedicels very short, at length up to 3 lin. long, 2-bracteolate at the base; nectaries sessile. Calyx $\frac{1}{3}$ to over $\frac{1}{2}$ in. long, pubescent; segments lanceolate, subulate-acuminate. Corolla brilliant violet-purple, 2 to over $2\frac{1}{2}$ in. long, obliquely campanulate, more or less pubescent; throat up to 1 in. wide; lowest lobe suborbicular, up to 1 in. in diam. Capsule 10–12 lin. long, 2–$2\frac{1}{2}$ lin. broad, obtusely quadrangular and 4-sulcate, finely pubescent or glabrescent, beak short, broad. Seeds blackish, 1–$1\frac{1}{4}$ lin. long, margins acute, faces radially rugose, sides pitted.—Hiern in Cat. Afr. Pl. Welw. i. 797; Engl. Pfl. Ost-Afr. C. 365, and Bot. Jahrb. xix. 158, and xxviii. 483; Dur. & Schinz, Études Fl. Congo, i. 215; De Wild. & Durand, Reliq. Dewevr. 173. *S. macranthum*, Oliver in Trans. Linn. Soc. xxix, 131, t. 84; Engl. Pfl. Ost-Afr. A, 64; var. *angustifolium*, Oliver, l.c. *Volkameria angolensis*, O. Kuntze, Rev. Gen. Pl. ii. 482.

Nile Land. Uganda: Budda District; Dumu, 5000 ft., *Dawe*, 5!

Lower Guinea. Angola: Pungo Andongo; various places, *Welwitsch*, 1645! Malange, *Mechow*, 411; *Pogge*, 297.

South Central. Congo Free State: Goia Kapopa, near the Lualaba River, *Pogge*, 998; Lulua River, *Pogge*, 299; Kasongo, *Dewèvre*, 991.

Mozamb. Dist. German East Africa: Urundi, *Scott-Elliot*, 8250! Itolio, *Stuhlmann*, 924; between Kagehi and Utunda, *Stuhlmann*, 3480; Usui, *Speke & Grant*, 204! Usaramo; Muhonyera, *Speke & Grant!* Khutu Steppe, 1700 ft., *Goetze!* and without precise locality, *Hannington!* British Central Africa: Urungu; Fwambo, 5250 ft., *Nutt! Carson*, 71! Nyasaland; Fort Hill, *Johnston!* Masuka Plateau, 6500–7000 ft., *Whyte!* Uvera, *Kenyon*, 19! Angoniland, *Purves*, 57! near Blantyre, *Last!* near Zomba, *Purves*, 163! near Sani Hill, *Kirk!* Shire Highlands, *Buchanan*, 338! 705!

11. **S. rigidum,** *Peyritsch in Wawra & Peyritsch, Sert. Benguel.* 32 (*Sitz. Ber. Akad. Wiss. Wien, Math. Nat. Cl.* xxxviii. 1859, 572). Stem erect, 3–4 ft. high, stiff, branched from the base, terete, slender, like the whole plant finely and spreadingly pubescent with few glands among the hairs, at length glabrescent below; branches long, rigid. Leaves oblong-lanceolate or lanceolate to linear, rounded or subretuse at the apex, cuneate at the base, quite entire, lower up to $1\frac{1}{4}$ in. long and $\frac{1}{4}$ in. broad, upper much shorter and narrower, pale below; petiole 2–$\frac{1}{2}$ lin. long. Bracts spathulate-linear, 4–3 lin. long. Pedicels slender, $1\frac{1}{2}$–4 lin. (in the fruiting state up to 8 lin.) long, minutely 2-bracteolate at the base. Calyx $2\frac{1}{2}$–3 lin. long; segments linear. Corolla pale rose, punctate in the throat, 7–10 lin. long; lowest lobe 4–5 lin. long and broad, whitish. Capsule ovate-oblong (or subglobose according to *Peyritsch*),

5–7 lin. long, 3 lin. wide, densely pubescent, beak up to 2 lin. long. Seeds $1\frac{1}{4}$ lin. long, margins (or at least one of them) acute, sides rather broad, oblique, pitted, faces flat or one of them convex, with prominent radial lines from the margins towards the centre.—Hiern in Cat. Afr. Pl. Welw. i. 799.

Lower Guinea. Angola: among shrubs near Benguella, *Wawra*, 286; on the sandy shore between Benguella and Catumbella River, *Welwitsch*, 1646! Mossamedes; Chella Mountains, *Johnston!*

Var. *digitaloides*, Stapf. Somewhat taller with larger leaves and flowers and a more copious and more glandular indumentum. Corolla dull red or deep rosy-purple spotted in the throat. Seeds slightly larger with more acute margins. *S. digitaloides*, Welw. ex Schinz in Bull. Herb. Boiss. iv. 454; Hiern in Cat. Afr. Pl. Welw. i. 798. *S. schinzianum*, Engl. & Gilg in Baum, Kunene-Samb. Exped. 371, not of Aschers.

Lower Guinea. Angola: Mossamedes; banks of the Rivers Giraul and Bero, near the sea-shore, *Welwitsch*, 1647! in dry river beds north of Mossamedes, *Gossweiler*, 54! near Mossamedes, *Höpfner*, by the Coroca River, above Garganto do Diabo, 1000 ft., *Baum*, 7!

I suspect that this variety represents merely a more robust state of *S. rigidum*. The leaves attain over $1\frac{1}{2}$ in. in length and over $\frac{1}{4}$ in. in width in Gossweiler's specimen and 2 in. and $\frac{1}{3}$ in. respectively in Baum's and Höpfner's. The longest pedicels of Gossweiler's plant are 6 lin., those of Höpfner's $8\frac{1}{2}$ lin. long, whilst the calyx measures up to 3 lin. and the corolla up to $1\frac{1}{2}$ in. in length. The tomentum is much more copious in Gossweiler's specimen than in Welwitsch, 1646, and distinctly villous in Baum, 7, and most of the soft spreading hairs are gland-tipped, which is rarely the case in typical *S. rigidum*. Welwitsch 1647, on the other hand, is intermediate between both. The general habit, the shape of the leaves and corollas is the same in the type and the variety.

12. **S. radiatum,** *Schumach. in Schumach. & Thonn. Beskr. Guin. Pl.* 282. The whole plant emitting an unpleasant odour, like *Hyoscyamus*. Stems erect, simple or branched, up to 4, or more, feet high, more or less glandular-pubescent (often villous in the upper part when young) and sparingly mealy-glandular, obtusely quadrangular, sulcate. Leaves scarcely or not at all heteromorphic; lower ovate, coarsely toothed, acute at both ends, up to $2\frac{1}{2}$ in. long and $1\frac{1}{2}$ in. broad, borne on petioles up to 1 in. long; upper leaves lanceolate, entire (rarely dentate), up to 4 in. long, $\frac{3}{4}$ in. broad, with shorter but always distinct petioles, gradually passing into the similar foliaceous bracts, sometimes also the upper leaves ovate and dentate; all the leaves sparingly and persistently hairy and mealy-glandular below, nervation impressed above, raised below. Pedicels very short, at length up to $\frac{1}{4}$ in. long, 2-bracteolate at the base; nectaries sessile. Calyx 2–$2\frac{1}{2}$ lin. long, pubescent; segments lanceolate, acuminate. Corolla up to $1\frac{1}{2}$ in. long, obliquely campanulate, purple or purplish and white; lowest lobe up to $\frac{1}{3}$ in. long, suborbicular. Capsule 1–$1\frac{1}{4}$ in. long, $3\frac{1}{2}$–4 lin. broad, pubescent to subvillous, with a short broad beak. Seeds $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long, dark brown, faces radially rugose, sides narrow, pitted, one margin acute, the other usually rounded off; hence the seed plano-convex or bi-convex.—Webb in Hook. Niger Fl. 150. *S. occidentale*, Regel & Heer in Ind. Sem. Hort. Turic. (1842); DC. Prodr. ix. 250. *S.*

fœtidum, Afzel. ex Engl. Jahrb. xix. 156. *Sesamopteris radiata*, DC. l.c. 251, excl. syn. Endl.

Upper Guinea. Senegambia, *Heudelot*, 547! Sierra Leone: Sherboro, *Scott-Elliot*, 5897! and without precise locality, *Afzelius*. Liberia: Monrovia, *Naumann*, 54. Bassa, *Vogel!* Togo: Bismarckburg, *Kling*, 16, 44; Dahomey, *Burton!* Lagos! Abeokuta, *Irving! Rowland!* and without precise locality, *Moloney! Phillips*, 48! *Punch!* Northern Nigeria! Nupe, *Barter*, 1202! Asaba, *Barter*, 292! Cross River at Ikuse, *Holland*, 185! Cameroons: Cameroon River, *Mann*, 734! Mungo, *Buchholz*; Yaunde, *Zenker*, 259! Fernando Po, *Vogel*, 23!

Engler quotes this plant also from Jur, *Schweinfurth*, 2085; German East Africa, Muansa, *Stuhlmann*, 4157, 4560 and Zanzibar, *Stuhlmann* i, 1078. I have not seen any specimens from East Africa. It occurs occasionally as a weed in various parts of the tropics. Oil is extracted from the seeds according to Zenker; but there is no clear evidence that the plant is cultivated.

13. **S. Marlothii,** *Engl. Jahrb.* x. 257, *t.* 7, *fig. D.* Stem like the whole plant densely glandular-hairy, 2–2½ lin. thick. Lower leaves 3-foliolate; leaflets oblong, the intermediate 1⅔–2 in. long, 1 in. broad; lateral leaflets 5–15 lin. long, 5–7 lin. broad; petioles ¾–1⅔ in. long; upper leaves linear-oblong, about 1 in. long, 2–2½ lin. broad, shortly petioled. Pedicels at first slender, 1½–2 lin. long, at length very stout, up to 3½ lin. long; nectaries sessile. Calyx 3–3½ lin. long; segments linear-lanceolate. Corolla obliquely campanulate, over 1½ in. long; lobes very short. Capsule 1¼ in. long, 2½ lin. broad, densely glandular-hairy, beak short, very acute. Seed 1¼ lin. long, blackish, faces radially rugose near the acute margins with a well-defined smooth central area.

Lower Guinea. German South-west Africa: Hereroland; by the Swakop River, 2000 ft., *Marloth*, 1448! Kann Valley, *Schenck*, 428.

14. **S. indicum,** *Linn. Sp. Pl. ed.* 1, 634. Stems erect, simple or branched, from a few to 6 ft. high, very sparingly and finely pubescent and more or less mealy-glandular, at length glabrescent, obtusely quadrangular, sulcate. Leaves very variable, usually heteromorphic; lowest long petioled (petiole 4–6 in. long), 3-partite or 3-foliolate; segments or leaflets ovate to ovate-lanceolate, acute, deeply dentate, 3–6 in. long, 1–2 in. broad; upper with much shorter petioles, lanceolate, acute, attenuated at the base, 2–4 in. long, ¼–¾ in. broad, entire, rarely repand, passing into the similar foliaceous bracts; intermediate leaves also intermediate in shape and size; all the leaves very sparingly and minutely pubescent, more or less mealy-glandular below. Pedicels very short, at length 2 lin. long, 2-bracteolate or subebracteolate at the base; nectaries sessile. Calyx 2½ lin. long, finely pubescent; segments lanceolate, acute. Corolla about 1 in. long, obliquely campanulate, whitish, tinged with pink or purple. Capsule ¾–1 in. long, ¼–⅓ in. broad, usually finely pubescent, rather abruptly contracted into a short deltoid beak. Seeds pale brown or dark, 1½ lin. long, faces smooth.—Bot. Mag. t. 1688; Endl. Iconogr. t. 70; Bernh. in Linnæa, xvi. 37, 42; DC. Prodr. ix. 250 and Pl. Rar. Gen. 18, t. 5; Wight, Illustr. t. 163; A. Rich. Tent. Fl. Abyss. ii. 62; Welw. Apont. Phyto-Geogr. 551; Oliver in Trans.

Linn. Soc. xxix. 131; Bentl. & Trim. Med. Pl. t. 198; Ficalho, Pl. Uteis, 237; Hook. f. Fl. Brit. Ind. iv. 387; Engl. Pfl. Ost-Afr. B. 156 486, fig. 21; Watt, Dict. Econ. Prod. Ind. vi. ii. 502–542; Stapf in Engl. & Prantl, Nat. Pflanzenfam. iv. 3 B. 262, fig. 100, A—L; Köhler, Med. Pfl. iii.; De Wild. & Durand, Pl. Thonner. Congol. 34, and Pl. Gillet. in Bull. Herb. Boiss. 2me sér. i. 39; Semler, Trop. Agrik. ed. ii. 472. *S. orientale*, Linn. Sp. Pl. ed. 1, 634; Lam. Illustr. iii. 82, t. 528; Gærtn. Fruct. t. 110; Endl. in Linnæa, vii. 30; Chamisso in Linnæa, vii. 723; Bernh. in Linnæa, xvi. 37, 42; Hiern in Cat. Afr. Pl. Welw. i. 797. *S. edule*, Hort. ex Steud. Nom. ed. i. 769. *S. oleiferum*, Moench, Meth. Suppl. 174. *S. brasiliense*, Vell. Fl. Flum. 264, vi. t. 90. *Anthadenia sesamoides*, Van Houtte in Hort. Vanhoutt. fasc. i. 4, and in Fl. des Serres, ii. (Avril 1846) 10, t. 6. *Volkameria orientalis*, O. Kuntze, Rev. Gen. Pl. ii. 481. *V. sesamodes*, O. Kuntze, l.c. 482.

Upper Guinea. Senegambia: Galam, *Roger*, 140! and without precise locality, *Heudelot!* Sierra Leone, *Don.* Northern Nigeria: Nupe, *Barter*, 1260!

Nile Land. Nubia: Korkos Island between Berber and Khartoum, *Schweinfurth*, 748! Abyssinia: Jelajereune, *Schimper*, 620! Kordofan, *Kotschy*, 181! 194! *Pfund*, 368! By the White Nile, *Petherick!* Uganda: Kavirondo; Mumias, *Scott-Elliot*, 7058! in various localities, 4400–6000 ft., *Whyte!*

Lower Guinea. Lower Congo: Kisantu, *Gillet*, 353. Angola: Libongo; by the Lifune River, *Welwitsch*, 1639; Cazengo; near Cacula, *Welwitsch*, 1640! Golungo Alto; by the Cuango River, near Sange, *Welwitsch*, 1688! Pungo Andongo; near the Cuanza River, near Sansamanda, and in neglected fields near Condo, *Welwitsch*, 1641.

South Central. Congo Free State: plantations near Businga, *Thonner*, 115.

Mozamb. Dist. German East Africa: Mininga, *Speke & Grant*, 74! Kilimanjaro, *Johnston!* Rovuma River, *Meller!* Portuguese East Africa: Chriange, east of Lake Nyasa, *Johnson*, 332! British Central Africa: Nyasaland; Katunga, *Scott!*

Cultivated in many of the above localities and in most tropical and subtropical countries for the oil which is extracted from the seeds, very probably of tropical African origin.

Engler (*Jahrb.* xxxii. 115) described a variety *integerrimum*, which appears to be merely a stunted state, about 1 ft. high, with entire oblong leaves and short capsules. It was collected by Ellenbeck in the Galla Country near Gallaboda-Jidda at 4300–4600 ft., and by Pogge in the Congo Free State by the Lulua River. A specimen collected by Whyte in Kavirondo, not far from Mumias at 4400 ft., represents evidently the same condition.

15. **S. alatum,** *Thonn. in Schumach. & Thonn. Beskr. Guin. Pl.* 284. Stem erect, branched, 2–3 ft. high, more or less quadrangular and 4-sulcate or almost terete, glandular in the upper part, soon glabrescent. Leaves usually heteromorphic; lower long-petioled (petiole up to 4 in. long), digitately 5–(–3) foliolate or 5–(–3) partite; leaflets or segments linear-lanceolate, entire, acute or subacute, the middle one the longest, 1–3 in. long, 1–4 lin. broad, more or less mealy-glandular below, otherwise glabrous; upper leaves and foliaceous bracts undivided, lanceolate to finely linear, often less than 1 lin. broad,

attenuated into the slender petioles, which decrease rapidly upwards. Pedicels very short, at length very stout, and slightly over 1 lin. long, subebracteolate; nectaries sessile. Calyx 2 lin. long, more or less mealy-glandular; segments subulate-lanceolate. Corolla obliquely campanulate, curved near the base, pink to carmine, dark spotted in the throat, about 1 in. long; lobes subequal. Capsule 1½–2 in. long, 2½–3 lin. wide in the upper part, narrowed towards the base, acuminate-rostrate, finely pubescent; beak very slender, up to ½ in. long. Seeds with an apical and a basal wing; nucleus muriculate-foveolate; wings orbicular, firmly membranous, 2½ lin. long, ½ lin. wide.—Engl. Pfl. Ost-Afr. C. 365. *S. pterospermum*, R. Br. in Salt, Abyss. App. 64; and in Denham, Dixon & Clapperton, App. 239. *S. rostratum*, Hochst. in Flora, 1841, i. Intell. Bl. 43. *S. gracile*, Endl. in Linnæa. vii. 10, t. 3, figs. 43–49. *Sesamopteris alata*, DC. Prodr. ix. 251. *Simsimum rostratum*, Bernh. in Linnæa, xvi. 39, 42.

Upper Guinea. Senegambia, *Roger!* Northern Nigeria; Borgu, *Barter*, 991! Bornu, *Denham-Clapperton.*

Nile Land. Soudan: near Khartoum, *Schweinfurth*, 818! Kordofan: Om Gasch, *Pfund*, 354! at the foot of Arashkol Mountain, *Kotschy*, 106! and without precise locality, *Kotschy*, 46! 94! Eritrea: Hakeko, *Lord!*

Mozamb. Dist. Portuguese East Africa: Chiloane, *Scott!* Bechuanaland: Ngamiland; Botletle Valley, *Lugard*, 188!

16. **S. Schenckii,** *Aschers. in Verhandl. Bot. Ver. Brandenb.* xxx. 184. Stem up to 2½ ft. high, erect, stout, sparingly and finely mealy-glandular in the upper part. Leaves heteromorphic, the lowest and uppermost entire, the intermediate palmately 5–7-partite; segments like the entire leaves linear, intermediate segment up to 2⅔ in. long, 2 lin. broad; petioles up to 4 in. long. Calyx 2½ lin. long; segments lanceolate, acute, villous-ciliate. Corolla with a purple tube and a paler limb (bluish according to *Belck*), villous, 1¾ in. long. Capsule 1¼ in. long, 2½ lin. thick, shortly beaked. Seeds 1½ lin. long, not winged, faces muricate-foveolate.

Lower Guinea. German South-west Africa: Hereroland; Kan Valley, *Schenck*, 431; Ameib, at the foot of the Erongo Mountains, *Belck*, 34.

Evidently very closely allied to *S. capense.*

17. **S. capense,** *Burm. fil. Prodr. Cap.* 17. Stem erect, simple or branched, ½–6 ft. high, slender or stout, angular and sulcate or subterete, more or less mealy-glandular in the upper part, otherwise glabrous. Leaves digitately 5–3-foliolate; leaflets obovate-oblong to linear or lanceolate, subobtuse or obtuse, entire, narrowed at the base into a petiolule, or the outer sessile or fusing below, the intermediate the longest 1–2½ in. long, 1–9 lin. broad above, glaucous and mealy-glandular beneath, more or less mealy-glandular on both sides; petioles 3–1 in. long, gradually decreasing upwards. Pedicels at first slender, 1 lin. long, at length very stout, up to 2 lin. long, subebracteolate; nectaries sessile. Calyx 2½ lin. long, more or less pubescent; segments lanceolate, acuminate. Corolla violet outside, violet-purple inside,

pubescent, obliquely campanulate; tube up to 1 in. long, very slightly curved at the base; lobes about ½ in. long, subequal. Capsule 1½–1¾ in. long, ¼–⅓ in. broad, sparingly pubescent; each valve strongly 3-nerved and produced at the base into 2 rounded or obscurely 3-lobed knobs o short horns; beak about 5 lin. long, subulate-acuminate from a triangular base. Seeds ⅓ in. long including the wing which runs all round from the base leaving the apex on one side, faces muriculate-foveolate.—Stapf in Dyer, Fl. Cap. iv. ii. 461. *S. pentaphyllum*, E. Meyer in Drège, Zwei Pflanz. Documente, 50, 54; Hiern in Cat. Afr. Pl. Welw. i. 800; Baum, Kunene–Samb. Exped. 371. *S. triphyllum*, Welw. ex Asch. in Verh. Bot. Ver. Brandenb. xxx. 185, 239; Hiern in Cat. Afr. Pl. Welw. i. 799. *S. lepidotum*, Schinz in Bull. Herb. Boiss. iv. 455. *Sesamopteris pentaphylla*, DC. Prodr. ix. 251. *Volkameria triphylla*, O. Kuntze, Rev. Gen. Pl. i. 482.

Lower Guinea. Angola: Mossamedes; by the River Maiombo, near Pedra do Rei, *Welwitsch*, 1663! in the dry bed of the River Bero, *Welwitsch*, 1661 partly! Mossamedes, *Höpfner*, 118; *Newton*, 33. Huilla; between Nene and Humpata and near Lopollo and Monino, *Welwitsch*, 1662! Benguella; near Benguella, *Welwitsch*, fruit, 25! between Benguella and the River Cavado, *Welwitsch*, 1661 partly! near Napalanka on the Longa River, 3800 ft., *Baum*, 585. German South-west Africa; Amboland, *Schinz*.

Mozamb. Dist. Bechuanaland: Upper Siltagoli River, *Schenck*, 697!

Var. *grandiflorum*, Stapf. Calyx more or less woolly or pubescent with long hairs. Corolla pale purplish to white with a dark throat; tube up to 1¼ in. long; lobes up to ¾ in. long. Seeds with a short "spoon-like" wing at the upper end.—*S. grandiflorum*, Schinz in Bull. Herb. Boiss. iv. 453.

Lower Guinea. German South-west Africa: Amboland; Olukonda, *Rautanen*, 73! Hereroland; Nanas, *Fleck*, 274a!

Mozamb. Dist. Bechuanaland: Ngamiland; Kwebe Hills, 3300 ft., *Lugard*, 111! *Mrs. Lugard*, 172.

S. lepidotum was described from imperfect material (Höpfner, 118, and Newton, 33) and distinguished chiefly by the dense mealy glandular covering on both sides of the leaves. It agrees in this respect with Welwitsch's specimen, 1661, at Kew. The typical form occurs also in extratropical South Africa.

Imperfectly known species.

18. **S. Dinterii,** *Schinz in Bull. Herb. Boiss.* vii. 65. Stem erect, over 4 ft. high, like the whole plant densely covered with long fine spreading more or less gland-tipped hairs, terete or obscurely angular in the upper part, straw-coloured. Lower leaves unknown, upper lanceolate-elliptic to lanceolate, acute, apiculate, entire, up to 1⅔ in. long and up to 7 lin. broad, glaucous; petiole very slender up to 10 lin. long. Pedicels up to 2 lin. long, at length rather stout and 3 lin. long. Calyx 7–8 lin. long; segments lanceolate. Corolla pink with large yellow spots in the throat, very obliquely campanulate, 2 in. long; limb very oblique; lobes subequal, about 7 lin. long and 8 lin. broad. Capsule about 1⅓ in. long, 2½–3 lin. broad, densely pubescent to villous; beak up to 4 lin. long, broad. Seeds brown, strongly compressed, 1½ lin. long, faces radially rugose near the margins, perfectly smooth in the centre, sides very narrow, pitted, margins acute.

Lower Guinea. German South-west Africa: Hereroland; near Salem, *Dinter*, 2; near Ubib, *Lindner!*

This is very closely allied to, if not identical with, *S. Marlothii*, from which it differs (apart from the lower leaves, which are not known) only in the somewhat larger and more oblique corolla and the less stout pedicels.

7. **CERATOTHECA,** Endl.; Benth. et Hook. f. Gen. Pl. ii. 1059.

Calyx small or middle-sized, 5-partite, suboblique. Corolla obliquely subcampanulate; limb very oblique, porrect, obscurely 2-labiate, the lowest lobe by far the longest. Stamens subdidynamous, inserted low down in the corolla-tube, not conniving; filaments slender, filiform; anthers dorsifixed; cells parallel, dehiscing longitudinally to the base. Disc annular, equal. Ovary 2-celled; cells divided by a spurious septum almost to the apex; ovules numerous, 1-seriate in each division. Capsule oblong, compressed transverse to the septum, more or less loculicidal towards the base; each carpel produced into a short spreading horn at the apex. Seeds numerous, compressed, obovate.—Annual erect or procumbent herbs. Leaves membranous, petioled, dentate or crenate. Flowers solitary in the axils of the leaves on short pedicels, rose, lilac or yellow.

Species 5, one of them extending into South Africa.

All the leaves entire	1. *C. elliptica.*
Leaves more or less coarsely dentate or crenate, or the uppermost entire.	
Corolla $\frac{2}{3}$–1 in. long.	
Leaves ovate with few mucilage glands; bracts lanceolate, entire	2. *C. integribracteata.*
Leaves usually deltoid to hastate, glaucous or almost white beneath from mucilage glands; bracts similar to the leaves, but smaller and narrower	3. *C. sesamoides.*
Corolla 2–3 in. long	4. *C. triloba.*

1. **C. elliptica,** *Schinz in Bull. Herb. Boiss.* iv. 452. Stem slender, erect, $1\frac{1}{2}$ ft. high, much-branched from the base, terete below, obscurely quadrangular above, shortly and spreadingly pubescent and like the whole plant more or less viscid. Leaves elliptic, obtuse or subacute, entire, more or less acute at the base; lower $\frac{3}{4}$–$1\frac{1}{4}$ in. long, 7–10 lin. broad; upper narrower, passing into the entire oblong-lanceolate foliaceous bracts, pubescent, particularly below; lateral nerves 2–3, very oblique; lower petioles $\frac{1}{4}$–$\frac{1}{3}$ in. long, the upper much shorter. Pedicels 1–$1\frac{1}{2}$ lin. long, with a pair of subulate bracteoles at the base. Calyx 2 lin. long, densely pubescent. Corolla yellowish with a purplish tinge, black-punctate all over, slightly over 1 in. long; lower lobe suborbicular $3\frac{1}{2}$ lin. long, 4–5 lin. broad. Capsule 5 lin. long; horns $2\frac{1}{2}$ lin. long.—*C. integribracteata,* Hiern in Cat. Afr. Pl. Welw. i. 800, partly.

Lower Guinea. Angola: Mossamedes; in sandy places by the River Bero, near Cavalheiros, *Welwitsch,* 1654! Gambos, *Newton.*

2. **C. integribracteata,** *Engl. Jahrb.* xix. 156. Stems slender, erect, 1–2½ ft. high, sparingly branched, obscurely quadrangular, more or less long and softly hairy. Leaves ovate, acute to acuminate, subcordate or truncate at the base, 1¼–2½ in. long, 1–2 in. broad, coarsely dentate or crenate; the upper narrower, more sparingly dentate, passing into the lanceolate entire foliaceous bracts, loosely hairy, very sparingly mealy-glandular; lateral nerves 3–4, very oblique, ascending; lower petioles 3 lin. long, upper much shorter. Pedicels 1–2 lin. long with a pair of subulate bracteoles at the base. Calyx 2–2½ lin. long, long and softly hairy; segments lanceolate. Corolla rose-coloured with purple streaks in the throat and on the lower lobe, 10–12 lin. long; lower lobe orbicular, 4–5 lin. across. Capsule about 5 lin. long, 2–2½ lin. broad, villous or glabrescent; horns 1½ lin. long with a broad triangular base. Seeds slightly over 1 lin. long, margins smooth, faces minutely wrinkled.—Hiern in Cat. Afr. Pl. Welw. i. 800, partly; Henriques in Bull. Soc. Brot. xvi. 72.

Lower Guinea. Angola: Melange, *Buchner*, 80, *Marques*, 33, 37; Pungo Andongo, *Mechow*, 95; Zenza do Golungo; Mongolo Mountains at Muchao, *Welwitsch*, 1650! Golungo Alto; near Sange, *Welwitsch*, 1651! and fruit, *Welwitsch*, 822! 823! Cazengo; near Cacula, *Welwitsch*, 1649! Ambaca; between Ngombe and Lucala River, *Welwitsch*, 1652! Huilla; near Lopollo, *Welwitsch*, 1653!

3. **C. sesamoides,** *Endl. in Linnæa*, vii. 5, *tt.* 1–2. Stems erect or suberect, branched, ½–2 ft. high, slender, pubescent. Leaves deltoid-ovate to ovate or the upper oblong to linear-oblong, from a more or less truncate base, or hastate, dentate, or entire above the middle, pubescent, very densely mealy-glandular, glaucous or whitish beneath; petioles of the lower leaves up to more than 1 in. long, very slender, upper much shorter. Calyx pubescent, 2–2½ lin. long; segments lanceolate. Corolla ⅔ to almost 1 in. long, pale lilac, throat tinged with yellow and marked with purple lines; lower lobes broad-ovate, 7–10 lin. long. Capsule 6–8 lin. long, 2½–3 lin. broad, hairy; horns up to 1½ lin. long, rarely very minute or quite suppressed. Seeds brown or black, slightly over 1 lin. long, margin transversely rugose.—DC. Prodr. ix. 252 (excl. syn. *S. pterospermum*, R. Br.); Bernh. in Linnæa, xvi. 41; Schweinf. Beitr. Fl. Aethiop. 97; Klotzsch in Peters, Reise Mossamb. Bot. 188 excl. syn.; Engl. Pfl. Ost-Afr. B. 520, C. 365, and Jahrb. xxxii. 115. *C. sesamoides*, var. *melanoptera*, DC. l.c.; Klotzsch, l.c. *C. melanosperma*, Hochst. ex Bernh. l.c. 32, 41.

Upper Guinea. Senegambia: near Kouma, *Roger*, 141! and without precise locality, *Heudelot*, 147! *Kohaut!*

Nile Land. Kordofan: Arashkol Mountain, *Kotschy*, 101! Dyika, *Pfund*, 112! Obeid, *Pfund*, 85! Taiara, *Pfund*, 461! and without precise locality, *Kotschy*, 105: Jur; Jur Ghattas, *Schweinfurth*, 2456! Uganda: Acholi country, cultivated, *Dawe*, 860!

Mozamb. Dist. Portuguese East Africa: Lower Zambesi; Senna, *Kirk! Peters;* Shupanga, *Stewart! Kirk!* Tete, *Kirk! Peters;* Boros, *Peters;* Moramballa, *Kirk! Scott!* British Central Africa: Niomkolo Island in Lake Tanganyika, *Carson!* Nyasaland: west shore of Lake Nyasa, *Kirk!* Uvera,

Kenyon, 8! Likoma Islands, *Johnson!* between Kondowe and Karonga, *Whyte!* Karonga, *Scott!* and without precise locality, *Whyte! Buchanan*, 1238! Shesheke, on the Zambesi. *Holub!*

The length of the horns of the capsule varies considerably even in the same specimen, and they may be reduced to small sharp points or quite suppressed as is the case in some of the fruits of Whyte's and Scott's specimens from Karonga. These muticous or submuticous forms agree, however, in all other characters with typical *C. sesamoides*. According to Dawe this species is cultivated and used like *Sesamum* in the Acholi country.

4. **C. triloba,** *E. Meyer ex Bernh. in Linnæa*, xvi. 29. Stems erect, up to 6 ft. high, simple or branched, obtusely quadrangular, pubescent to villous. Leaves polymorphic, lower long-petioled, from broadly ovate-cordate or almost rounded to broadly triangular and 3-lobed with the lateral lobes spreading, 1½–6 in. long and broad, coarsely crenate, more or less pubescent to subvillous, particularly below; upper leaves narrower, shortly petioled, passing into the ovate-lanceolate or lanceolate, sparingly crenate or entire bracts; lower petioles 2–5 in. long. Flowers opposite in a long loose raceme up to 1 ft. long; pedicels very short. Calyx ¼–½ in. long, densely hairy; segments lanceolate. Corolla lilac with purple streaks in the throat and on the lowest lobe, 2–3 in. long; lowest lobe ovate, 2–3 lin. long. Capsule 8–11 lin. long, 2½ lin. broad, loosely pubescent to subvillous; horns about 2½ lin. long, much compressed at the broad base. Seeds slightly over 1 lin. long, margins smooth, faces wrinkled.—Bot. Mag. t. 6974; Stapf in Dyer, Fl. Cap. iv. ii. 462. *C. lamiifolia*, Engl. Jahrb. xix. 156. *Sporledera triloba*, Bernh. l.c. 42; DC. Prodr. ix. 252; Gard. Chron. 1887, ii. 492, fig. 99. *S. krausseana*, Bernh. l.c.; DC. l.c. 253. *Sesamum lamiifolium*, Engl. Jahrb. x. 256.

Mozamb. Dist. Bechuanaland: Kalahari Desert; Mamunwe, *Lugard*, 241! Bamanguato Country; Shoshong, *Holub!* Rocky Shasha River, *Holub!* banks and islands of Matengwe River, *Holub*, 1283! Matabeleland: Buluwayo, *Rand*, 379! and without precise locality, *Elliott!* Mashonaland: between Umtali and Salisbury, *Hon. Mrs. Evelyn Cecil*, 52! Manica, *Bryce!*

Also in South Africa. The whole plant has a strong unpleasant odour like that *Hyoscyamus niger*.

8. PRETREOTHAMNUS, Engl. Jahrb. xxxvi. 228.

Calyx small, 5-partite; segments lanceolate-linear. Corolla obliquely campanulate; limb oblique, porrect, subbilabiate; lowest lobe by far the longest. Stamens didynamous, inserted low down in the corolla tube, not conniving; filaments slender, filiform; anthers dorsifixed, cells parallel, dehiscing longitudinally. Ovary 4-celled (2-celled completely divided by a spurious septum?); ovules 3 in each division, superposed. Fruit unknown.—A small shrub densely glandular-hairy in the young parts. Leaves coarsely sinuate-dentate. Flowers rose-coloured, solitary in the axils of the leaves on slender pedicels.

Species 1, endemic.

1. **P. rosaceus,** *Engl. Jahrb.* xxxvi. 228, *with figure on p.* 229. A shrub, $1\frac{1}{2}$–$4\frac{1}{2}$ ft. high; young branches 1 lin. thick, densely hairy, older glabrous, reddish-brown, with the bark peeling off in thin flakes. Leaves crowded towards the tips of the branches, obovate-oblong, cuneate at the base, coarsely sinuate-dentate, up to 1 in. long, about $\frac{1}{2}$ in. broad, rather densely hairy. Pedicels 3–4 lin. long, densely pubescent. Calyx $1\frac{1}{2}$–2 lin. long, densely pubescent. Corolla slightly over 1 in. long, densely glandular-pubescent, excepting the base; lowest lobe ovate, $\frac{1}{2}$ in. long, the others short, rotundate; throat almost $\frac{3}{4}$ in. wide. Ovary ovoid-ellipsoid, pubescent; style hairy.

Nile Land. Somaliland: Boran; Jeroko, *Ellenbeck*, 2199.

The fruit of this genus is unknown, but the general appearance of the plant as figured by Engler points to a very close affinity with *Ceratotheca* or *Pretrea*, although there seems to be no indication of central spines or lateral horns in the ovary.

9. **PRETREA**, J. Gay; Benth. et Hook. f. Gen. Pl. ii. 1059.

Calyx small, 5-partite; segments lanceolate. Corolla obliquely campanulate; limb oblique, porrect, subbilabiate; lowest lobe by far the longest. Stamens subdidynamous, inserted low down in the corolla-tube, not conniving; filaments slender, filiform; anthers dorsifixed, cells parallel, dehiscing longitudinally. Disc annular, equal. Ovary 2-celled; cells completely divided by a spurious septum; ovules 2 in each division. Fruit indehiscent, very hard, disc-shaped with 2 conical spines from near the centre; mesocarp ultimately with 2–4 large cavities. Seeds 2 in each division; testa delicate.—Perennial, trailing herbs. Leaves deeply sinuate-dentate to laciniate. Flowers rose-coloured to crimson, solitary in the axils of the leaves, nodding on long slender pedicels.

Species 1, extending into South Africa.

1. **P. zanguebarica**, *J. Gay in Ann. Sc. Nat. 1re sér.* i. 457. Stems branched, trailing, up to 6 ft. long, more or less hairy. Leaves broad-ovate to elliptic or oblong in outline, deeply sinuate-dentate or laciniate, $\frac{1}{2}$–1 in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. broad, more or less pubescent, densely mealy-glandular and white below; petiole 2–3 lin. long. Pedicels 1–2 in. long. Calyx 2–3 lin. long, pubescent and glandular-mealy. Corolla 1–$1\frac{1}{4}$ in. long; lowest lobe $\frac{1}{4}$–$\frac{1}{3}$ in. long. Fruit $\frac{2}{3}$–$\frac{4}{5}$ in. in diam.—DC. Prodr. ix. 256; Decne in Ann. Sc. Nat. 5me sér. iii. 333; Klotzsch in Peters, Reise Mossamb. Bot. 188; Engl. Pfl. Ost-Afr. C. 365; Stapf in Engl. & Prantl, Pflanzenfam. iv. 3 B. 264, fig. 97, A.B. 98, K. and in Dyer, Fl. Cap. iv. ii. 463; Hiern in Cat. Afr. Pl. Welw. i. 801. *P. bojeriana*, Decne in Ducht. Rev. Bot. i. 517. *P. Forbesii*, Decne in Ann. Sc. Nat. 5me sér. iii. 334. *P. eriocarpa*, Decne l.c.; Baum, Kunene–Samb. Exped. 372. *P. loasæfolia*, Klotzsch, l.c. 188; Decne in Ann. Sc. Nat. 5me sér. iii. 334. *P. artemisiæfolia*, Klotzsch, l.c. 189, t. 31. *P. senecioides*, Klotzsch, l.c. 189, t. 32. *Martynia zanguebarica*, Lour. Fl. Coch. 386. *Diceroceryum sinuatum*, Bojer in Ann. Sc. Nat. 2me sér. iv. 269, t. 10.

Nile Land. British East Africa: near Malindi, *Allen*, 157!

Lower Guinea. Angola: Kalolo, on the River Kubango, 3600 ft., *Baum!* German South-west Africa: Amboland; Olukonda, *Rautanen*, 275a!

Mozamb. Dist. Zanzibar, *Bojer! Roquett in Herb. Welwitsch*, 1656. German East Africa: Dar es Salaam, *Hildebrandt*, 1133! Portuguese East Africa: opposite Mozambique, *Peters!* Inhambane, *Peters;* Lower Zambesi; Sena, *Peters;* Mouth of the Zambesi, *Kirk!* Kongone River, *Kirk*, 334! Missongwe, on the Lower Zambesi, *Scott!* Namuli Hills, Makua Country, *Last!* British Central Africa: Lake Shirwa, *Kirk!* Mashonaland: Salisbury, *Hon. Mrs. Evelyn Cecil*, 73! Bechuanaland: Leshumo Valley, *Holub*, 710! 842! Ngamiland: Botletle Valley, *Lugard*, 208! Shesheke, on the Zambesi, *Holub*, 541! 542!

Also in South Africa.

10. **LINARIOPSIS**, Welw.; Benth. et Hook. f. Gen. Pl. ii. 1060.

Calyx small, 5-partite; segments linear, the posticous much shorter than the others. Corolla subobliquely campanulate; limb oblique, porrect; lowest lobe longer than the others. Stamens 4, subdidynamous, not converging; filaments filiform; anthers oblong, dorsifixed; cells parallel, dehiscing longitudinally to the base. Disc annular, equal. Ovary 1-celled, very imperfectly divided at the base; ovules 2 from the base, erect. Fruit ellipsoid, obtusely quadrangular, slightly dorsally compressed, hard, indehiscent or very tardily dehiscent at the apex, and at right angles to the imperfect septum, with an acute keel over the back of each carpel and a faint one over their commissures; tubercled between the keels. Seeds 2 or 1, obovate, margins narrowly winged towards the base, faces smooth.—Perrenial, prostrate herbs. Leaves small, ovate-lanceolate. Flowers rather small, violet, solitary in the axils of the leaves.

Species 1, endemic.

1. **L. prostrata,** *Welw. in Trans. Linn. Soc.* xxvii. 53. Root cylindric or fusiform, as thick as a finger. Stem branched from the base; branches prostrate, up to ½ ft. long, pubescent; internodes 3–5 lin. long. Leaves ovate-lanceolate to oblong, subobtuse at both ends, up to 7 lin. long, 3–4 lin. broad, entire or sparingly and obscurely dentate, ciliolate, densely covered below with white glands, otherwise almost glabrous; petioles very short or hardly any. Calyx 1½ lin. long, hairy, persistent. Corolla purplish with dark purple streaks and spots in the throat, scarcely ½ in. long. Fruit 2½–3 lin. long. Seeds rotundate-obtuse at the apex, truncate at the base, 1½ to almost 2 lin. long.—Stapf in Engl. & Prantl, Pflanzenfam. iv. 3 B, 264, fig. 97, H—K; 98, C; Baum, Kunene–Samb. Exped. 371.

Lower Guinea. Angola: Huilla; between Mumpulla and Humpata, 4000–5000 ft., *Welwitsch*, 1659! on moors by the Kubango River, below Massaca, 4000 ft., *Baum*, 286.

Welwitsch describes the flowers as purplish, Baum as of a dirty yellowish-brown. Welwitsch's dried specimens combine both colours.

11. **SESAMOTHAMNUS,** Welw.; Benth. et Hook. f. Gen. Pl. ii. 1058.

Calyx small, 5-partite, oblique. Corolla-tube very long, cylindrical, gently curved, with the back produced at the base into an often long slender spur; limb spreading, large, obscurely bilabiate; lobes 5, suborbicular, subequal. Stamens 4, subdidynamous, almost equal, inserted above the middle of the corolla-tube; posticous filaments shorter than the anticous or 0; anthers linear-oblong, parallel, dorsifixed. Disc fused with the base of the ovary, oblique and posticously gibbous. Ovary 2-celled; cells divided nearly to the apex by a spurious septum; ovules many, 1-seriate in each division. Fruit an oblong rigid capsule, laterally (at right angles to the septum) compressed, loculicidal from the apex to the base. Seeds numerous, flat, transversely oblong, winged.—Shrubs with a short swollen bole, from which spring numerous erect stiff grey branches, or a small tree, armed with spreading spines (modified leaves). Foliage leaves in fascicles on arrested branchlets in the axils of the spines, deciduous. Flowers large, white or pale pink, in terminal and subterminal few-flowered short racemes.

Species 5, endemic.

Inner corolla-lobes long and densely fringed . . 1. *S. busseanus.*
Corolla-lobes not fringed.
  Spur up to $2\frac{1}{2}$ lin. long . . . . . 2. *S. Lugardii.*
  Spur 1–$1\frac{2}{3}$ in. long.
    Corolla-tube glabrous apart from the mucilage glands.
      Posticous anthers sessile . . . . . 3. *S. benguellensis.*
      Posticous filaments 3 lin. long . . . . 4. *S. Smithii.*
    Corolla-tube long, hairy in the upper part . . 5. *S. Erlangeri.*

1. **S. busseanus,** *Engl. Jahrb.* xxxii. 114. A small tree or shrub 12–15 ft. high, leafless when in flower. Branches ascending, covered with grey bark, pale ferruginous when quite young; spines spreading, 5–6 lin. long, up to $2\frac{1}{2}$ lin. thick at the base. Flowers on short greyish hairy branchlets, which bear 1 small lateral spine on each side at the base; pedicels $2\frac{1}{2}$–3 lin. long. Calyx $1\frac{1}{2}$ lin. long; segments triangular, acute, the posticous smaller, narrower and deflexed. Corolla white tube cylindric to beyond the middle then funnel-shaped, $1\frac{2}{3}$ in. long, $1\frac{3}{4}$ lin. wide; spur very slender, $2\frac{1}{2}$–$2\frac{3}{4}$ in. long, $\frac{3}{4}$ lin. thick; limb almost 2 in. across; segments orbicular-ovate, the 4 inner fringed, 9–10 lin. in diam. (without the fringes); fringes very much dichotomously divided with a linear stalk or claw, exceeding the diameter of the lobes in length; outermost lobes slightly smaller, naked. Filaments almost entirely adnate to the corolla-tube; anthers 3 lin. long. Capsule elliptic, apiculate, $2\frac{1}{2}$ in. long, 10 lin. broad, sparingly hairy, dark brown. Seeds obovate or subreniform, 3–$3\frac{1}{2}$ lin. long: wings up to $2\frac{1}{2}$ lin. broad.

Mozamb. Dist. German East Africa: Salanda, south of Lake Victoria, *Fischer*, 454; Ugogo; near Ipala, *Busse*, 222.

2. **S. Lugardii,** *N. E. Br.* A small bushy tree, 12 ft. high. Flowering branches up to over 2 lin. thick, bark brown to ashy-grey; spines 2–6 lin. long, spreading. Leaves on very short arrested branchlets in the axils of the spines, fascicled, produced with or after the flowers, cuneate-oblong or narrowly obovate, obtuse or retuse at the apex, 6–10 lin. long, 2–3½ lin. broad, densely covered with a white scurf of exceedingly minute stellate hairs on both sides, particularly beneath. Flowers 1–3, terminal on the long shoots or on the short leaf-bearing branchlets; pedicels 2–5 lin. long, white-scurfy. Calyx 2–3 lin. long; segments deltoid-ovate, obtuse, 4 anterior subequal, the posticous smaller. Corolla densely covered with white scurf when young; tube 3–3½ lin. long, 2½ lin. wide, slightly curved, cylindric, dorsally produced at the base into a stout blunt spur up to 2½ lin. long, tomentose within below, glabrous above; limb 2 in. across; lobes 8–9 lin. broad. Stamens inserted 5–6 lin. below the mouth; anticous filaments 2½ lin. long, posticous 1½ lin. long; anthers 2½–3 lin. long. Capsule rectangular-elliptic to obovate in outline, submarginate at the apex, brown, more or less white-scurfy. Seeds transversely elliptic-oblong, 4½–5 lin. long, 6–8 lin. broad, wings broad.

Mozamb. Dist. Northern Kalahari desert: near Chukutse Salt Pan, 3000 ft., *Lugard*, 274!

Lower Guinea. German South-west Africa: Damaraland, *Chapman & Baines!*

3. **S. benguellensis,** *Welw. in Trans. Linn. Soc.* xxvii. 50, *t.* 18. A shrub of very variable habit, when young slender, 4 ft. high, with a stem as thick as a finger, sparingly branched or almost simple, spinous all along, when old with a short bole, 4–6 ft. in circumference, divided into short branches, as thick as an arm, from which spring numerous erect or oblique shoots, 4–6 ft. long and abundantly armed with spreading spines; spines 4–6 lin. long. Leaves appearing after the flowers, obovate-spathulate, obtuse or submarginate, gradually attenuated into the petiole, 4–6 lin. long, glaucescent. Racemes 3–7-flowered; pedicels stout 2–4 (rarely to 5) lin. long, 2-bracteolate; bracteoles ovate or lanceolate, scarcely 1 lin. long. Calyx-segments ovate-triangular, acute or subacute, the anterior 4 subequal, 2–3 lin. long, the posticous smaller, more or less deflexed. Corolla white to pale pink, sweet scented; tube 2¼–2½ in. long, 1½–2 lin. thick at the middle; spur 1–1¼ in. long, horizontal; limb 2–2¼ in. in diam.; lobes ½–¾ in. broad, margin entire, naked. Posticous anthers sessile. Capsule elongate-obovate or obovate-oblong, 3–3½ in. long, 1–1½ in. broad. Seeds 5 lin. long, 8–9 lin. broad including the wings, which are 3 lin. broad where widest.—Hiern in Cat. Afr. Pl. Welw. i. 796; Baum, Kunene-Samb. Exped. 371.

Lower Guinea. Angola: Mossamedes; in dry rocky places on the Serra da Cazimba, between Cazimba and Quitibe, 600–1000 ft., and at Cazimba, *Welwitsch*, 1509! Chella Mountains, between Nevis and Petri Grande, 1000 ft., *Baum*, 1006!

4. **S. Smithii,** *Baker.* Stem and leaves unknown. Flowers in 3–7-flowered racemes; rhachis purplish, densely mealy-glandular, not

much over 1 in. long, rather slender; bracts very small, or the lowest sometimes foliaceous with a small obovate densely mealy-glandular blade; pedicels up to 3 lin. long, 2-bracteolate; bracteoles very small. Calyx $1\frac{1}{2}$ lin. long; segments ovate, obtuse, subequal or the posticous much smaller and deflexed. Corolla-tube $2\frac{1}{2}$ in. long, $1\frac{1}{2}$ lin. wide below, $3\frac{1}{2}$ lin. wide near the mouth, sparingly pubescent within near the base; spur very slender, 1–$1\frac{1}{2}$ in. long, recurved; limb $1\frac{3}{4}$ in. across; lobes obovate-orbicular, 7–9 lin. broad. Posticous filaments 3 lin. long.—Stapf in Engl. & Prantl, Pflanzenfam. iv. 3 B. 262.

Mozamb. Dist. German East Africa: Kilimanjaro, *Smith!*

5. **S. Erlangeri,** *Engl. Jahrb.* xxxii. 113. A small tree, 15 ft. high; branches glaucous when young; spines about 5 lin. long, up to $2\frac{1}{2}$ lin. thick at the base. Leaves obovate, obtuse or subemarginate, $1\frac{2}{3}$ in. long, $1\frac{1}{4}$ in. broad, thick, rigid, densely mealy-glandular, loosely and prominently reticulate below; petiole $2\frac{1}{2}$–$3\frac{1}{2}$ lin. long. Bracts long hairy, lower ovate, $1\frac{1}{2}$ lin. long, 1 lin. broad; bracteoles spathulate, up to $2\frac{1}{2}$ lin. long; pedicels stout. Calyx over 1 lin. long; segments ovate, obtuse. Corolla pale pink; tube $2\frac{1}{2}$ in. long, 2 lin. wide at the middle, slightly widened and long-hairy above; spur $1\frac{2}{3}$ in. long, 1 lin. wide; lobes broad-ovate, covered with short white hairs within, 7–10 lin. broad, 10 lin. long. Filaments almost entirely adnate; anthers 2 lin. long.

Nile Land. Abyssinia: country of the Arussi Gallas; Wabi-Budugo, on dry wooded ground, *Ellenbeck*, 1166.

Imperfectly known species.

6. **S. Rivæ,** *Engl. in Ann. Istit. Bot. Roma*, vii. 30. A tree with terete glaucescent branches; spines sparse, recurved or spreading, 5–8 lin. long, bearing a pair of shorter spines in their axils. Leaves and flowers unknown. Capsule elongate-oblong, suboblique, apiculate, 2–$2\frac{1}{4}$ in. long, 8–10 lin. broad. Seeds very delicately winged, $2\frac{1}{2}$ lin. long and broad.—Engl. Jahrb. xxxii. 114.

Nile Land. Somaliland: Ogaden; near Karoul, *Riva*, 1089.

Engler suggests (*Bot. Jahrb.* xxxii. 114) that this may be the fruiting condition of *S. Erlangeri*.

12. SIGMATOSIPHON, Engl. Jahrb. xix. 150.

Calyx 5-partite. Corolla-tube very long, cylindrical, slightly widened towards the ends, S-shaped, densely hairy within up to the middle, symmetric and without a spur at the base; limb spreading, large obscurely 2-labiate; lobes 5, ovate, obtuse. Stamens 4, subdidynamous, inserted below the mouth of the corolla; anthers sagittate; cells attached to the connective with their tips. Disc fused with the base of the ovary, equal all round. Ovary 2-celled; cells divided nearly to the apex by a spurious septum; ovules many, 1-seriate in each

cell. Fruit unknown.—Shrubs with a short trunk and long spinous branches. Foliage leaves in fascicles on arrested branchlets in the axils of the spines, deciduous. Flowers large yellow, in terminal racemes.

Species 1, endemic.

1. **S. Gürichii,** *Engl. l.c.* 151. A shrub, 9–12 ft. high; spines about 5 lin. long; flowering branches slender. Leaves obovate-cuneate, 5 lin. long, 1½–2 lin. broad, deciduous before flowering. Pedicels 3 lin. long, greyish-tomentose. Calyx greyish-tomentose; segments triangular. Corolla greyish-tomentose at first, then glabrescent, yellow; tube 2½ in. long, 2 lin. wide at the middle, 2½–3 lin. wide near the base and the mouth; lobes 7–8 lin. long, 5 lin. broad. Anthers exserted, 2 lin. long. —Stapf in Engl. & Prantl, Natürl. Pflanzenfam. iv. 3 B. 262.

Lower Guinea. German South-west Africa; Southern Kaoko, at Dawib Kurub and between Franzfontein and Chorichas, *Gürich,* 16.

ADDENDA

5*a*. **Prevostea insignis,** *Rendle.* A shrub; leafy branchlets terete, bearing a brown pubescence. Leaves elliptic to elliptic-obovate, apex acuminate, subcoriaceous, glabrous, the midrib and 6 to 8 ascending secondary nerves conspicuous on the lower surface, up to about 6 in. long by 2¼ in. broad; petiole densely brown-pubescent, about ½ in. long. Inflorescence terminal, about 2 in. long in the fruit; peduncle densely brown-pubescent; fruits usually geminate in the axils of small densely pubescent foliaceous bracts; pedicel ½ in. or more long, bearing just below the middle a pair of membranous, narrowly obovate, glabrous bracteoles, about ⅓ in. long. Flowers absent; the two outer persistent membranous veined sepals suborbicular with rounded apex and reniform base, the outer larger reaching in the specimen 2½ in. by 2¼ in. Fruit unripe, one-celled, one-seeded, apparently indehiscent.

Upper Guinea. Liberia: Kakatown, *Whyte!*

Distinguished from the other species by its terminal inflorescence.

6*a*. **S. togoense,** *Dammer in Schlechter, West-Afr. Kautschuk-Exped.* 312, *name only.* A climbing shrub. Stem slender, twining, glabrous; young branches pilose. Leaves thin, broadly lanceolate, slightly undulate, decurrent on the petiole, about 2½ in. long, 1½ in. broad; petiole ½–¾ in. long. Cymes lateral, small, subumbellate; peduncle pilose; pedicels glabrous, slender, thickened towards the apex. Calyx cup-shaped, 5-toothed, 1½ lin. in diam.; teeth broad, acute, less than a line long. Corolla 5-fid; lobes recurved, linear-lanceolate, puberulous outside, ⅓ in. long, 1 lin. wide. Stamens 5; filaments very short, free; anthers conglutinate, 2 lin. long, pores terminal. Ovary conical, scarcely ½ lin. long; style ¼ in. long; stigma flat.—Engl. Jahrb. xxxviii. 59.

Upper Guinea. Togo: amongst climbing shrubs near Badja, *Schlechter*, 12974.

Allied to *S. bifurcum*, Hochst.

8*a*. **S. darassumense,** *Dammer in Engl. Jahrb.* xxxviii. 57. An unarmed shrub about 3 ft. high. Branches slender, elongate, terete, furnished when young with very minute early deciduous hairs. Leaves ovate, ¼–½ in. long, ¼–½ in. wide, hairy when young like the branches; petiole slightly shorter than the blade. Flowers solitary; pedicels slender, about ½ in. long, filiform, very minutely stellate-pilose. Calyx 4-partite; lobes long triangular, acute, 1½ lin. long, very minutely

stellate-pilose. Corolla 4-partite, white; lobes ovate-lanceolate, $3\frac{1}{2}$ lin. long, $1\frac{1}{2}$ lin. wide. Stamens 4; filaments scarcely $\frac{1}{2}$ lin. long; anthers $2\frac{1}{2}$ lin. long, $\frac{1}{2}$ lin. wide, with 2 apical pores. Ovary conical, scarcely $\frac{1}{2}$ lin. long; style straight, $3\frac{1}{2}$ lin. long.

Nile Land. Somaliland: frontier of Arussi-Galla, at Darassuma, 3000 ft., *Ellenbeck*, 2024.

20*a*. **S. withaniifolium,** *Dammer in Engl. Jahrb.* xxxviii. 58. An unarmed shrub 3–6 ft. high. Branches very minutely stellate-pilose. Leaves lanceolate or ovate, obtuse, 2–3 in. long, 1–$1\frac{3}{4}$ in. wide, very minutely stellate-pilose; petiole about 1 in. long. Cymes terminal or extra-axillary, many-flowered; peduncles $\frac{3}{4}$ in. long, densely stellate-hairy; pedicels $\frac{1}{2}$ in. long, slender, nearly glabrous. Calyx campanulate, $1\frac{1}{2}$ lin. in diam., 5-fid, sparingly and very minutely stellate-hairy; lobes rotundate, acuminate, $1\frac{1}{2}$ lin. long, 1 lin. wide. Corolla blue, scarcely plicate; lobes 5, long lanceolate, $\frac{1}{2}$ in. long, $\frac{1}{6}$ in. wide, very minutely stellate-pilose outside towards the apex. Stamens 5; filaments very short; anthers unequal, four $2\frac{1}{2}$ lin. long, one $4\frac{1}{2}$ lin. long, curved. Ovary globose, $\frac{1}{2}$ lin. in diam., nearly glabrous; style curved, glabrous, thickened near the apex, $\frac{1}{2}$ in. long; stigma capitate. Berry 5 lin. in diam.

Nile Land. Somaliland: Dadab, in dried up river beds, *Ellenbeck*, 166.

52*a*. **S. Ellenbeckii,** *Dammer in Engl. Jahrb.* xxxviii. 58. A small, very spiny herb. Branches sparingly stellate hairy, densely covered with straight straw-coloured very slightly laterally compressed spines $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaves ovate or broadly lanceolate, sinuate, 2–3 in. long, 1–2 in. wide, scabrid with stellate hairs on both surfaces, bearing straight straw-coloured spines $\frac{1}{2}$–5 lin. long on the nerves; petiole $\frac{1}{6}$ in. long, stellately hairy and spiny. Cymes terminal; peduncle about 1 in. long, as well as the pedicels and calyx stellately hairy and spiny; pedicels about $\frac{1}{2}$ in. long. Calyx 5-fid, angular; lobes 1 lin. long. Corolla rotate, plicate, lilac, $\frac{2}{3}$ in. in diam.; lobes $\frac{1}{4}$ in. long, $\frac{1}{8}$ in. wide, stellately hairy outside. Stamens 5; filaments 1 lin. long; anthers oval, about $1\frac{1}{2}$ lin. long, pores terminal. Ovary globose, $\frac{1}{2}$ lin. in diam., densely stellate hairy; style sigmoid, $\frac{1}{3}$ in. long, thickened towards the apex, stellately hairy below; stigma capitate.

Nile Land. Somaliland: amongst rocks at Hensa, 1300 ft., *Ellenbeck*, 247.

57*a*. **S. longestamineum,** *Dammer in Engl. Jahrb.* xxxviii. 58. A spiny climbing shrub. Branches slender, elongate, when young stellately hairy; spines recurved from a broad base, laterally compressed, about 1 lin. long. Leaves lanceolate, ovate or oblong, entire or slightly sinuate, acuminate, stellately pilose on both surfaces, sometimes spiny on the under side of the nerves; petiole up to $\frac{1}{2}$ in. long, stellately hairy and spiny. Cymes few-flowered, extra-axillary; peduncle about $\frac{1}{2}$ in. long, usually spiny, like the pedicels; calyx and corolla stellately hairy; pedicels about $\frac{1}{2}$ in. long. Calyx 5-partite; lobes obovate, long acuminate, $\frac{1}{4}$ in. long, $\frac{1}{8}$ in. wide. Corolla lilac, scarcely

plicate, 5-fid ; lobes ½ in. long, ⅙ in. wide. Stamens 5 ; filaments very short ; anthers ⅓ in. long, pores terminal. Ovary globose, ⅛ in. in diam., stellately hairy above ; style slightly curved, nearly ½ in. long, stellately hairy in the lower half ; stigma capitate. Berry globose, ⅓ in. in diam.

Nile Land. Galla Country : in woods at Dagage, *Ellenbeck*, 1000.

74*a*. **S. Buettneri,** *Dammer in Engl. Jahrb.* xxxviii. 59. A herb. Young branches densely stellate-hairy ; spines scattered, about 1 lin. long, slightly recurved, flattened, yellow. Leaves lanceolate or ovate, repand, oblique at the base, 4 in. long, about 2¼ in. wide, at first stellately hairy on both surfaces, at length almost glabrous above, ashy stellate-tomentose beneath, spiny ; petiole ½–1¼ in. long, spiny. Cymes few-flowered ; flowers small ; pedicels ¼ in. long, stellately hairy. Calyx 5-fid ; lobes triangular-lanceolate, 1 lin. long, ¾ lin. wide, acute, densely stellate hairy outside. Corolla 5-fid ; lobes ⅕ in. long, linear-lanceolate, acute, densely stellate hairy on the back and on the midribs inside. Stamens 5 ; filaments very short ; anthers oblong, 1 lin. long, pores terminal. Ovary globose ; style 1½ lin. long ; stigma globose. Berry globose, black, ¼ in. in diam., seated on the accrescent calyx-lobes.

Upper Guinea. Togo : Katamara Farm, *Buettner*, 655.

82*a*. **S. dennekense,** *Dammer in Engl. Jahrb.* xxxviii. 57. A branched shrub. Branches spiny, densely stellate-tomentose ; spines laterally compressed, about ¼ in. long, at first covered with stellate tomentum. Leaves broadly ovate, acute, densely and minutely stellate-tomentose on both sides, up to 2½ in. long and 1½ in. wide, with a few nearly straight spines ; petiole nearly ½ in. long. Inflorescence a terminal few-flowered cyme ; peduncle ⅓ in. long ; pedicels about ⅙ in. long, stellately tomentose. Calyx campanulate, angular, sometimes spiny, 5-fid, stellate-tomentose outside, ¼ in. long, about ¼ in. in diam. ; lobes lanceolate, acute, 1½ lin. long, about 1 lin. wide. Corolla pale violet, scarcely plicate, 5-partite ; lobes long lanceolate, minutely stellate-pilose outside, ½in. long, ⅙ in. wide. Stamens 5 ; filaments very short ; anthers with 2 apical pores, ⅓ in. long. Ovary globose, 1½ lin. long, densely stellate-pilose ; style straight, ½ in. long, stellate-pilose from the base to the middle ; stigma lateral, 2-lobed.

Nile Land. Galla Country : Arussi-Galla, 4900 ft., *Ellenbeck*, 1965.

92*a*. **S. sapiaceum,** *Dammer in Engl. Jahrb.* xxxviii. 60. A large much-branched shrub, up to 26 ft. high. Younger branches densely leafy, pale yellow, thinly covered with very minute white stellate hairs intermixed with longer ones ; some spines curved, flattened at the base, stellate-hairy in the lower half and up to ½ in. long, others straight from a thickened globose base, scarcely flattened. Leaves ovate-cordate, undulate, sinuate, 2–4 in. long, 1–2¼ in. wide, with very minute stellate hairs above, densely white-tomentose beneath ; lobes 3–4 on each side, the lowest the smallest, acute ; petiole ¾ in. long, sometimes spiny.

Cyme racemose, few-flowered; peduncle short, stellately tomentose. Calyx cupular, nearly $\frac{1}{4}$ in. in diam., 5-ribbed, 5-fid, stellately tomentose, spiny; lobes oval, mucronate. Corolla white or violet, rotate, plicate, 1 in. in diam.; lobes 5, reflexed, $\frac{1}{4}$ in. long, $1\frac{1}{2}$ lin. wide, triangular, densely stellate-tomentose on the back and stellate-pilose on the midrib on the upper side. Stamens 5; filaments very short; anthers $\frac{1}{4}$ in. long. Ovary conical, densely stellate-pilose, $\frac{1}{6}$ lin. long; style straight, glabrous.

Mozamb. Dist. German East Africa: Usambara; Kwai, 5000 ft., *Albers*, 247; Matengo Highlands; Kwa Djimula, *Busse*, 917.

1. **Utricularia transrugosa,** *Stapf.* Add: Stolons finely filiform, creeping in moss and among dwarf herbs, forming small matted tufts; rhizoids numerous, from the base of the scapes, 3 lin. long. Leaves one at the base of the scape and others scattered on the stolons, persistent or decayed at the time of flowering; blades spathulate, gradually narrowed into the slender petiole, 2–$2\frac{1}{2}$ lin. long, $\frac{1}{3}$–$\frac{3}{4}$ lin. broad; petiole up to 5 lin. long. Pitchers from the stolons and sometimes from the leaves (particularly the petioles), globose or pear-shaped, up to $\frac{3}{8}$ lin. long, stalk almost as long as the pitcher, mouth distinctly 2-lipped, lips fimbriate; lower lip shorter than the upper. Capsule globose, $1\frac{1}{2}$ lin. long; seeds (immature) hemispheric or hemi-ellipsoid, top with an entire margin.

Mozamb. Dist. Rhodesia: Matopo Hills, *Miss Gibbs*, 50!

5. **Utricularia Kirkii,** *Stapf.* Add:

Mozamb. Dist. Rhodesia: Livingstone Island and rain forest at the Victoria Falls, *Miss Gibbs*, 176!

8. **Utricularia Welwitschii,** *Oliver.* Read: Anthers about $\frac{1}{2}$ lin. long. Add:

Mozamb. Dist. Rhodesia: Matopo Hills, *Miss Gibbs*, 214!

9. **Utricularia firmula,** *Welw. ex Oliver.* Add:

Mozamb. Dist. Rhodesia: Matopo Hills, *Miss Gibbs*, 172! 173!

15*a*. **Utricularia Gibbsiæ,** *Stapf.* A delicate, terrestrial annual. Stolons creeping filiform or developed as rhizoids with very short, minutely verrucose branches. Leaves in small rosettes of about 3 or scattered along the stolons; blades very narrow, linear or linear-spathulate, obtuse, 1–3 lin. long, $\frac{1}{7}$–$\frac{1}{6}$ lin. broad; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ lin. long. Pitchers on the stolons and petioles, inverted with the mouth near the short stalk, globose, $\frac{3}{10}$ lin. diam.; upper lip divided to the base into 2 horn-like tentacles curved over the orifice; lower lip 0. Scape subcapillary, twining up to 4 in. high; scales ovate, acutely acuminate, up to $\frac{3}{4}$ lin. long. Flowers 6–1, rather close or remote; bracts resembling the scales; bracteoles subulate-lanceolate, half as long as the bracts; pedicel filiform, about $\frac{1}{2}$–1 lin. long, with two narrow, gradually widening wings near the tip. Sepals subequal, ovate, very acutely acuminate,

$1\frac{1}{2}$ lin. long. Corolla yellow, up to 3 lin. long (from the tip of the upper lip to the end of the spur); upper lip broad-oblong, emarginate, somewhat shorter than the upper sepal; lower lip spreading rotundate-quadrate, entire, not quite 1 lin. long, palate orange-coloured, flat, edge of the wide mouth eciliate; spur conic, rather slender from a broad base, $1\frac{1}{4}$–$1\frac{1}{2}$ lin. long. Anthers not quite $\frac{1}{8}$ lin. long; pollen with 4 slits and very minute pores; filaments up to $\frac{1}{3}$ lin. long, linear, not winged. Stigma subsessile; upper lip obscure; lower very broad and short. Capsule and seeds unknown.

Mozamb. Dist. Rhodesia: Livingstone Island and rain forest at the Victoria Falls, *Miss Gibbs*, 177!

Very similar to *U. tortilis*, Welw., but distinguished by the very acutely acuminate bracts and sepals, the winged tips of the pedicels and the narrower upper corolla-lip.

33. **Utricularia exoleta,** *R Br.* Add:

Mozamb. Dist. Rhodesia: Livingstone Island and rain forest at the Victoria Falls, *Miss Gibbs*, 174!

1. **Genlisea africana,** *Oliver.* Add:

Mozamb. Dist. Rhodesia: Livingstone Island and rain forest at the Victoria Falls, *Miss Gibbs*, 219!

ERRATA.

Page 28, line 13, *for Ehrhetia* read *Ehretia*
,, 116, ,, 17, ,, Rwenzori *read* Ruwenzori
,, 232, ,, 31, ,, Hook *read* Hook
,, 458, ,, 3, ,, *filimormis* read *filiformis*

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Printed by BALLANTYNE & CO. LIMITED
Tavistock Street, London.